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FREQUENCY AND DURATION OF DISABILITIES CAUSING ABSENCE FROM WORK AMONG THE EMPLOYEES OF A PUBLIC UTILITY, 1933-1937 ¹

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INTRODUCTION

This, the fourth paper of a series (1-3) on disability among employees of the Boston Edison Co., is based on recorded absences due to disability lasting 1 calendar day or longer which ended during the years 1933 to 1937, inclusive.

In 1913 the company inaugurated a liberal disability benefit plan which provided for payment of wages in full or in part during disability, beginning with the first day of absence. During the second 6 months of membership, an employee is allowed accumulated sick leave of 1 day per month at full pay. After the first year of membership, full pay for continuous disability is allowed for 15 weeks; beyond this time three-fourths to one-fourth of the employee's wages are paid, the period of payment depending upon the number of years of employment with the company. However, for present purposes, all cases of continuous disability extending over 372 calendar days were automatically considered closed at the end of the three hundred and seventy-second day. In all instances days refer to calendar days, and absences of less than 1 full calendar day are omitted. For a detailed description of the sick leave plan the reader is referred to the earlier papers of the series.

While it is recognized that age is an important factor in the frequency of disabilities, and particularly in their duration, it has been decided for the purposes of the present report to dismiss this matter by referring the reader to the previous papers of the series, where details in this connection are presented. However, it is of interest to observe that, according to data published by the Bureau of the Census (4), the native white gainful male workers in 1930 under 35 years of age constituted 47 percent of the total of ages 18 through 69 years, while the corresponding percentage for females was 64. In the instance of

¹ From the Division of Industrial Hygiene, National Institute of Health, Washington, D. C.

the Edison employees, the corresponding percentages for males and females, respectively, were 42 and 68.

ANALYSIS OF DATA

The number of male and female person-years of membership, the number of absences on account of disabilities lasting one calendar day or longer which ended during 1933 to 1937, inclusive, and the days of disability arising from these absences are presented by years in table 1. The causes of disability are broadly grouped into industrial accidents, nonindustrial accidents, respiratory diseases, and non-respiratory diseases, respectively. Approximately 13 percent of the absences were diagnosed by the plant physician, 72 percent by the plant nurse, and 15 percent by the patient.

TABLE 1.—Number of absences lasting 1 calendar day or longer due to sickness and accidents, and number of calendar days of disability, by year; experience of employees of the Boston Edison Co., 1933-37, inclusive¹

Year in which absence ended	Person-years of membership	Number of absences					Number of calendar days of disability				
		All disabilities	Industrial accidents	Non-industrial accidents	Respiratory diseases	Non-respiratory diseases	All disabilities	Industrial accidents	Non-industrial accidents	Respiratory diseases	Non-respiratory diseases
Males											
1933-37 -----	12,969	11,672	228	592	6,977	3,875	97,504	6,503	7,994	38,611	44,396
1933 -----	2,565	2,209	44	121	1,416	628	20,413	1,617	2,000	7,879	8,917
1934 -----	2,557	2,436	74	132	1,431	799	21,793	1,906	1,663	8,943	9,281
1935 -----	2,552	2,324	42	127	1,334	821	20,413	1,070	1,601	7,251	10,491
1936 -----	2,606	2,292	36	106	1,328	822	16,995	716	1,056	6,184	9,039
1937 -----	2,689	2,411	32	106	1,468	805	17,890	1,194	1,674	8,354	6,668
Females											
1933-37 -----	3,272	5,956	11	252	3,078	2,615	35,518	441	2,627	17,335	15,115
1933 -----	629	1,075	4	44	565	462	6,739	388	618	3,255	2,478
1934 -----	623	1,214	2	55	627	530	9,006	4	424	4,189	4,380
1935 -----	622	1,134	0	59	590	485	6,954	0	568	3,466	2,920
1936 -----	681	1,169	3	44	585	537	6,319	25	609	2,832	2,853
1937 -----	717	1,364	2	50	711	601	6,500	24	408	3,593	2,475

¹ The number of days of disability is the number of calendar days from the date disability began to the date of return to work, or to the three hundred and seventy-second day, inclusive.

In 1936 as compared with 1935, the number of male person-years increased 2 percent and the female person-years, 9 percent; the year 1937 as compared with 1936 shows an increase of 3 percent for the males and 5 percent for the females. The total years of exposure for males amounted to 12,969 and for females to 3,272. For male employees the number of absences lasting 1 calendar day or longer from all disabilities was 11,672 with 97,504 days of disability, and for

female employees the corresponding figures were 5,956 and 35,518, respectively.

Frequency of disability by years.—Table 2 and figure 1, showing, among other things, the frequency of absences by years, reveal for all causes of disability approximately a stationary trend for both the male and the female employees, the trend for the former being on a lower level. The annual incidence rate for all disabilities including industrial and nonindustrial injuries lasting 1 calendar day or longer among the male employees was highest in 1934 (952.7 per 1,000), being 5.8 percent above the average for all years. A close second was the rate for 1935 (910.6). The lowest frequency was for 1933 (861.2). Like the males, the female employees experienced the highest rate in 1934 (1,948.6), which was 7.0 percent above the average for all years. The rate for 1937 among the females stood second (1,902.3).

The yearly rates of industrial accidents among the male employees since 1934 show a decidedly downward time trend. As may be expected, industrial injuries occurred comparatively infrequently among the female employees, primarily because of the kind of occupations in which they were engaged. These accident rates are not shown in the figure.

The incidence rates for nonindustrial injuries among the males show a slight downward trend since 1934. The female employees experienced the highest rate for nonindustrial injuries in 1935, the next in 1934, and the rates for the other years under consideration are definitely lower, and are similar in magnitude.

The frequency rate for respiratory diseases among the male employees during the 5 years as a whole was 538.0 absences per 1,000, and the time-trend is practically level. The rates for 1935 and 1936 were below the average for the 5-year period. During the 5-year period, among female employees absences due to respiratory diseases occurred approximately 75 percent more often than among males, and in 1934 the highest rate among the females was 80 percent above the corresponding rate for the males.

The nonrespiratory frequency rates by years among the women were generally two or three times as great as among the men, but there does not appear to have occurred any spectacular change from year to year among either sex.

Time lost, and severity rates, by years.—The average annual number of days of disability for the 5-year period was 7.5 per male as compared with 10.9 per female (table 2). Of importance is the fact that both sexes show the time-lost rates for each of the groups of causes to be on a decreasing trend with respect to time, each trend in the instance of the males being on a lower level than the corresponding trends given for the females (fig. 1).

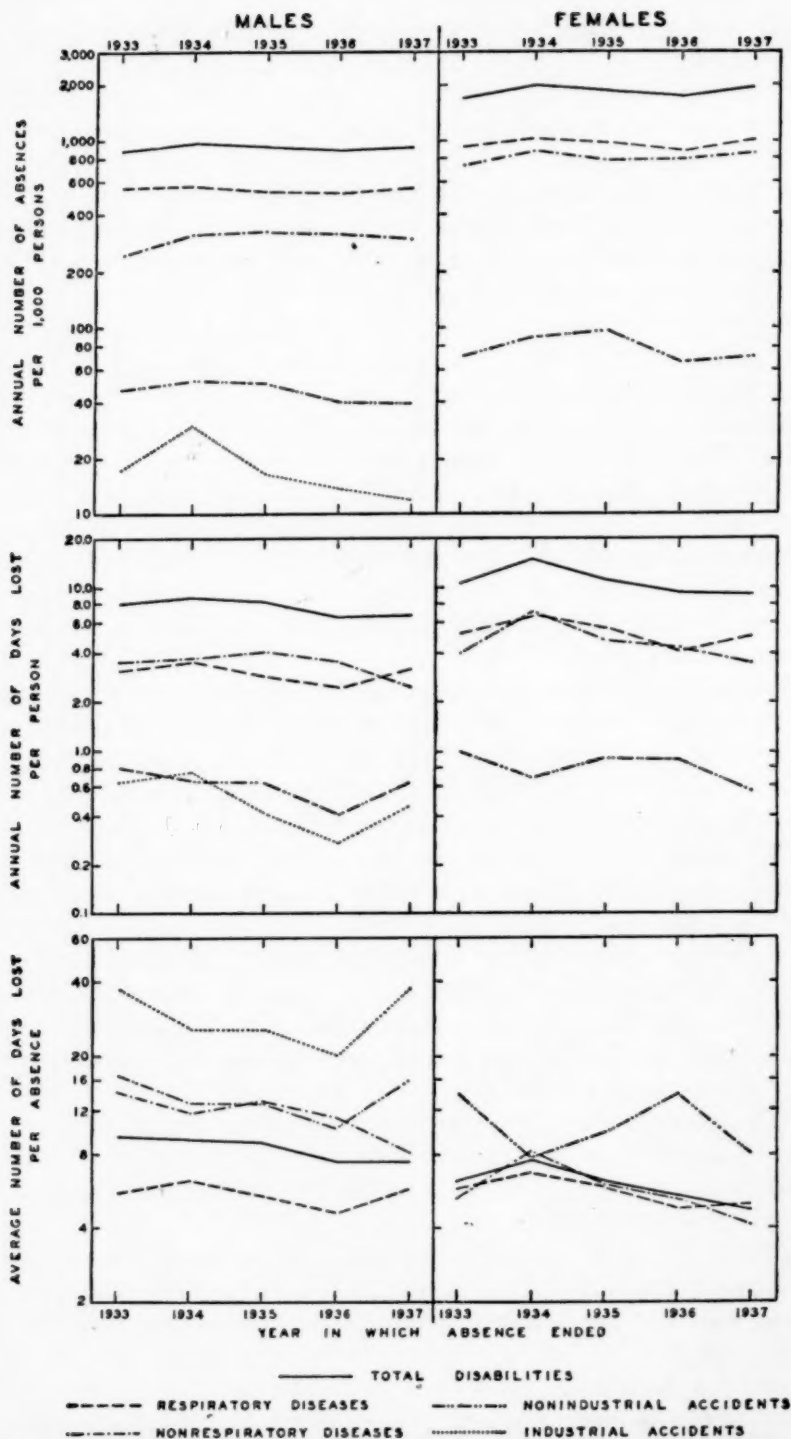


FIGURE 1.—Frequency of, time lost from, and severity of disability lasting 1 calendar day or longer among employees of the Boston Edison Co., 1933 to 1937, inclusive. Industrial accidents among females are omitted. (Logarithmic vertical scale.)

TABLE 2.—*Frequency of absences lasting 1 calendar day or longer due to sickness and accidents, annual number of days of disability per person, and average number of days per absence, by year; experience of employees of the Boston Edison Co., 1933-37, inclusive.¹ (Based on table 1)*

Year in which absence ended	Annual number of absences per 1,000 persons					Annual number of days per person					Average number of days per absence				
	All disabilities	Industrial accidents	Nonindustrial accidents	Respiratory diseases	Nonrespiratory diseases	All disabilities	Industrial accidents	Nonindustrial accidents	Respiratory diseases	Nonrespiratory diseases	All disabilities	Industrial accidents	Nonindustrial accidents	Respiratory diseases	Nonrespiratory diseases
Males															
1933-37.....	900.0	17.6	45.6	535.0	298.8	7.518	0.502	0.616	2.977	3.423	8.35	28.52	13.50	5.53	11.46
1933.....	861.2	17.2	47.2	552.0	244.8	7.958	.630	.780	3.072	3.476	9.24	36.75	16.53	5.56	14.20
1934.....	952.7	29.0	51.6	559.6	312.5	8.523	.745	.650	3.498	3.630	8.95	25.76	12.60	6.25	11.62
1935.....	910.6	16.4	49.8	522.7	321.7	7.999	.419	.628	2.841	4.111	8.78	25.48	12.61	5.44	12.78
1936.....	879.5	13.8	40.7	509.6	315.4	6.521	.275	.405	2.373	3.468	7.41	19.89	9.96	4.66	11.00
1937.....	896.6	11.9	39.4	545.9	299.4	6.653	.444	.622	3.107	2.480	7.42	37.31	15.79	5.09	8.28
Females															
1933-37.....	1,820.3	3.4	77.0	940.7	799.2	10.855	0.135	0.803	5.298	4.619	5.96	40.09	10.42	5.63	5.78
1933.....	1,709.1	6.4	69.9	898.3	734.5	10.714	.617	.982	5.175	3.940	6.27	37.00	14.05	5.76	5.36
1934.....	1,948.6	3.2	88.3	1,006.4	850.7	14.456	.006	.681	6.724	7.045	7.42	2.00	7.71	6.68	8.28
1935.....	1,823.2	0	94.9	948.6	779.7	11.180	0	.913	5.572	4.695	6.13	0	9.63	5.87	6.02
1936.....	1,716.6	4.4	64.6	859.0	788.6	9.279	.037	.894	4.159	4.189	5.41	8.33	13.84	4.84	5.31
1937.....	1,902.3	2.8	69.7	991.6	838.2	9.066	.034	.569	5.011	3.452	4.76	12.00	8.16	5.05	4.12

¹ The number of days of disability is the number of calendar days from the date disability began to the date of return to work, or to the three hundred seventy-second day, inclusive.

Italicized rates are based on less than 5 cases.

With respect to the severity rate, or the average number of days lost per absence, it is of interest to observe in figure 1 that decreasing time-trends are again in evidence, and this holds for the males as well as for the females. Industrial accidents, being infrequent among the females, are omitted; but with respect to the males, the severity rates for industrial accidents are well above the corresponding rates for nonindustrial accidents, nonrespiratory diseases, total disabilities, and respiratory diseases, respectively. In particular, during each of the 5 years the average number of days of disability per absence from all causes was greater for the males than for the females.

Frequency of, time lost from, and severity of disability by diagnosis.—The frequency of absences, and time lost, by sex and by diagnosis are shown in table 3, together with the average number of days of disability per absence. The annual number of absences lasting 1 calendar day or longer was, as indicated previously, 900.0 per 1,000 males and 1,820.3 per 1,000 females. With the exception of industrial accidents, the frequency of each disease or condition listed in table 3 was greater for females than for males. The respiratory absence rate for females (940.7 per 1,000) exceeded the male rate

(538.0 per 1,000) by 75 percent. The absence rate from digestive diseases among the females (298.3 per 1,000) was over twice the rate for males (148.3 per 1,000) and the nonrespiratory, nondigestive diseases caused over 3 times as many absences among the women as compared with the men.

TABLE 3.—*Frequency of absences lasting 1 calendar day or longer due to sickness and accidents, annual number of days of disability per person, and average number of days per absence, by cause; experience of employees of the Boston Edison Co., 1933-37, inclusive*¹

Diseases and conditions causing disability (with corresponding title numbers in parentheses from the International List of Causes of Death, fourth revision, Paris, 1929)	Annual number of absences per 1,000 persons		Annual number of days per person		Average number of days per absence		Number of absences		Number of days of disability	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
All disabilities	900.0	1,820.3	7.518	10.855	8.35	5.96	11,672	5,956	97,504	35,518
Industrial accidents	17.6	3.4	.502	.135	28.52	40.09	228	11	6,503	441
Nonindustrial accidents	45.6	77.0	.616	.803	13.50	10.42	592	252	7,994	2,627
Sickness	836.8	1,739.9	6.400	9.917	7.65	5.70	10,852	5,693	83,007	32,450
Respiratory diseases	538.0	940.7	2.977	5.298	5.53	5.63	6,977	3,078	38,611	17,335
Influenza, grippe (11)	166.3	216.4	1.169	1.703	7.03	7.87	2,157	708	15,156	5,573
Colds and coryza (104a)	216.7	403.4	.598	1.070	2.76	2.65	2,810	1,320	7,758	3,501
Bronchitis, acute and chronic (106) ..	61.5	97.8	.409	1.041	6.66	10.64	797	320	5,306	3,405
Diseases of the pharynx and tonsils (115a)	69.9	165.3	.399	.915	5.71	5.54	907	541	5,179	2,995
Other respiratory diseases	23.6	57.8	.402	.569	17.03	9.85	306	189	5,212	1,861
Digestive diseases	148.3	298.3	.967	1.519	6.52	5.09	1,923	976	12,542	4,970
Diseases of the stomach, cancer excepted (117-118)	79.9	163.2	.386	.407	4.82	2.49	1,037	534	5,002	1,330
Diarrhea, enteritis (120)	33.2	67.9	.114	.305	3.45	4.50	430	222	1,485	998
Other digestive diseases	35.2	67.2	.467	.807	13.28	12.01	456	220	6,055	2,642
Nonrespiratory, nondigestive diseases ..	150.5	500.9	2.456	3.100	16.32	6.19	1,952	1,639	31,854	10,145
Rheumatism, lumbago (56, 57, 156b)	32.9	39.1	.485	.347	14.72	8.88	427	128	6,284	1,137
Neuralgia, neuritis, sciatica (87a) ..	9.3	23.5	.125	.189	13.42	8.05	121	77	1,624	620
Neurasthenia and the like (part of 87b)	4.9	33.0	.105	.431	21.87	13.06	63	108	1,378	1,410
Diseases of the genito-urinary system (130-138)	9.9	.....	.172	.....	17.33	.....	129	.....	2,236	.....
Dysmenorrhea (139e) .....	.....	153.4	.....	.244	.....	1.59	.....	502	.....	798
Diseases of the skin (151-153)	14.5	25.1	.188	.148	12.96	5.90	188	82	2,437	484
Ill-defined or unknown causes (200) ..	33.8	127.5	.174	.343	5.16	2.69	438	417	2,258	1,121
All other diseases and conditions	45.2	99.3	1.206	1.398	26.68	14.08	586	325	15,637	4,575

¹ The number of days of disability is the number of calendar days from the date disability began to the date of return to work, or to the three hundred and seventy-second day, inclusive.

Number of person-years of membership: Males, 12,969; females, 3,272.

The time-lost rate, or the average annual number of days of disability per male employee, was 7.5, and per female employee, 10.9. The diseases and conditions which caused the largest annual number of days of disability per person among the male employees were in order of magnitude as follows: "all other diseases and conditions" (1.2 days), influenza and grippe (1.2 days), and nonindustrial injuries (0.6 day). The largest average annual number of days of disability per female was due to influenza and grippe (1.7 days); the next largest rate was given by "all other diseases and conditions" (1.4 days).

The average number of days per absence for all disabilities was 8.4 days for male employees, as compared with 6.0 for female employees. For respiratory diseases the average duration per absence was approxi-

mately the same for males (5.5 days) as for females (5.6 days). Digestive diseases as a whole averaged longer duration per case for the males than for the females.

Among the male employees the shortest duration per absence is shown for colds and coryza (2.8 days), and the longest for industrial injuries (28.5 days). Other disease groups causing an average of over a week's duration of disability per absence are "all other diseases and conditions" (26.7), neurasthenia and the like (21.9), diseases of the genito-urinary system (17.3), "other respiratory diseases" (17.0), rheumatism and lumbago (14.7), nonindustrial injuries (13.5), neuralgia, neuritis, and sciatica (13.4), "other digestive diseases" (13.3), and diseases of the skin (13.0).

TABLE 4.—Frequency of absences lasting 1 calendar day or longer due to sickness and accidents, by duration; experience of employees of the Boston Edison Co., 1933-37, inclusive

Duration of absence in calendar days ¹	All disabilities	Industrial accidents	Nonindustrial accidents	Sickness			
				Total	Respiratory diseases	Digestive diseases	Nonrespiratory, nondigestive disease
Annual number of absences per 1,000 males							
All durations.....	900.0	17.6	45.6	836.8	538.0	148.3	150.5
1.....	204.7	1.1	7.1	196.5	107.9	58.5	30.1
2.....	152.1	1.1	6.1	144.9	93.5	30.6	20.8
3.....	127.8	.7	5.2	121.9	85.2	20.0	16.7
4.....	86.0	.8	4.2	81.0	57.9	10.5	12.6
5.....	67.3	1.0	2.9	63.4	47.8	5.3	10.3
6.....	56.5	.8	2.5	53.2	40.2	4.1	8.9
7.....	52.4	.8	3.5	48.1	35.5	3.9	8.7
8-14.....	81.5	3.5	6.7	71.3	50.0	4.4	16.9
15-28.....	27.0	2.9	2.5	21.6	10.9	2.0	8.7
29-49.....	18.0	1.6	1.8	14.6	4.2	4.2	6.2
50-98.....	17.5	2.4	2.1	13.0	3.5	3.7	5.8
99-189.....	5.1	.6	.7	3.8	.8	.9	2.1
190-371.....	1.9	.2	.2	1.5	.1	.2	1.2
372.....	2.2	.1	.1	2.0	.6	0	1.5
Annual number of absences per 1,000 females							
All durations.....	1,820.3	3.4	77.0	1,739.9	940.7	298.3	500.9
1.....	593.5	.6	18.9	574.0	213.4	133.8	226.8
2.....	384.2	0	14.7	369.5	203.2	69.4	96.9
3.....	228.9	.6	8.2	220.1	136.6	34.6	48.9
4.....	142.4	.6	5.5	136.3	93.8	15.3	27.2
5.....	87.1	0	4.6	82.5	58.7	9.8	14.0
6.....	70.6	0	4.0	66.6	51.3	4.9	10.4
7.....	81.9	0	4.0	77.9	53.5	7.0	17.4
8-14.....	129.6	1.0	6.4	122.2	88.0	9.2	25.0
15-28.....	43.1	.3	5.5	37.3	23.9	.9	12.5
29-49.....	26.6	0	2.8	23.8	7.9	7.3	8.6
50-98.....	22.0	0	1.2	20.8	7.0	5.2	8.6
99-189.....	6.7	0	.6	6.1	1.8	.6	3.7
190-371.....	1.5	0	.3	1.2	.6	0	.6
372.....	2.2	.3	.3	1.6	1.0	.3	.3

¹ Number of calendar days from the date disability began to the date of return to work, or to the three hundred and seventy-second day, inclusive.

Number of person-years of membership: Males, 12,969; females, 3,272.

For the female employees the condition causing the shortest average duration per absence was dysmenorrhea (1.6 days). Diseases of the stomach, cancer excepted, stood second (2.5 days), and colds and coryza, third (2.7 days). Diseases or disease groups averaging 8 days or longer per absence were industrial injuries (40.1), "all other diseases and conditions" (14.1), neurasthenia and the like (13.1), "other digestive diseases" (12.0), bronchitis, acute and chronic (10.6), nonindustrial injuries (10.4), "other respiratory diseases" (9.9), rheumatism and lumbago (8.9), and neuralgia, neuritis, and sciatica (8.1).

Duration of disability.—The duration of disability in calendar days by groups of causes is shown in table 4. Remarkable differences are shown in the incidence rates by sex for absences of 1 and 2 days' duration. For all disability the 1-day absences among the women were 2.9 times as numerous as among the males, while 2-day absences were 2.5 times as frequent. The 1-day disabilities due to nonrespiratory, nondigestive diseases occurred over seven times as often among the females as the males; this difference cannot be explained entirely by the presence of dysmenorrhea, since, when absences caused by this condition are disregarded, the frequency among the females is still sufficiently great to be four times that among the males.

The duration of disability in calendar days for selected diseases is shown in table 5. The rate for 1-day's duration is largest for colds and coryza, dysmenorrhea, and diseases of the stomach, cancer excepted. The most frequent duration of absences due to influenza and grippe, and bronchitis, acute and chronic, appears to be about 3 days.

TABLE 5.—Frequency of absences lasting 1 calendar day or longer due to the specified causes, by duration; experience of employees of the Boston Edison Co., 1933–37, inclusive

Duration of absence in calendar days ¹	Influenza, grippe		Colds and coryza		Bronchitis, acute and chronic		Diseases of the pharynx and tonsils		Diseases of the stomach, cancer ex- cepted		Rheu- ma- tism, lum- bago		Dys- men- or- rhea	
	Annual number of absences per 1,000 persons													
	Male	Fe- male	Male	Fe- male	Male	Fe- male	Male	Fe- male	Male	Fe- male	Male	Fe- male	Male	Fe- male
All durations.....	166.3	216.4	216.7	403.4	61.5	97.8	69.9	165.3	79.9	163.2	32.9	153.4		
1.....	14.3	16.8	74.0	141.2	5.0	10.1	11.3	30.9	37.0	84.3	5.4	103.9		
2.....	19.7	31.5	48.6	110.6	8.9	13.8	12.1	35.4	14.9	40.7	3.9	27.2		
3.....	24.1	30.2	37.7	65.1	11.8	14.4	8.8	20.5	11.3	19.0	3.9	13.8		
4.....	18.9	24.2	21.6	32.4	8.7	11.6	7.0	18.3	5.6	6.4	3.6	4.9		
5.....	20.4	14.7	13.1	17.4	6.5	10.1	6.5	12.5	2.8	2.7	3.0	.6		
6.....	17.3	18.6	9.8	14.7	6.3	7.9	5.2	8.3	1.7	1.5	2.2	1.2		
7.....	17.5	22.0	6.4	9.5	4.5	8.2	5.8	10.4	1.6	3.1	1.9	.9		
8-14.....	25.5	37.9	5.2	11.6	7.2	14.6	9.7	20.8	1.7	4.0	3.8	.9		
15 and over.....	8.6	20.5	.3	.9	2.6	7.1	3.5	8.2	3.3	1.5	5.2	0		

¹ Number of calendar days from the date disability began to the date of return to work, or to the three hundred and seventy-second day, inclusive.

Number of person-years of membership: Males, 12,969; females, 3,272.

Percentage of total days of disability according to diagnosis.—The relative number of total days of disability caused by each of 17 specific diseases and conditions during 1933 to 1937, inclusive, is shown in figure 2, which is based on table 3. For male employees the days of disability on account of influenza and grippe constitute 15.5 percent of the total days of disability; nonindustrial injuries, 8.2 percent; colds and coryza, 8.0 percent; industrial injuries, 6.7 percent; rheumatism and lumbago, 6.5 percent; "other digestive diseases", 6.2 percent; bronchitis, acute and chronic, 5.4 percent; "other respiratory diseases", 5.4 percent; diseases of the pharynx and tonsils, 5.3 percent; diseases of the stomach, except cancer, 5.1 percent; diseases of the skin, 2.5 percent; ill-defined or unknown causes, 2.3 percent; diseases of the genito-urinary system, 2.3 percent; neuralgia, neuritis, sciatica, 1.7 percent; diarrhea and enteritis, 1.5 percent; neurasthenia and the like, 1.4 percent; all others, 18.0 percent.

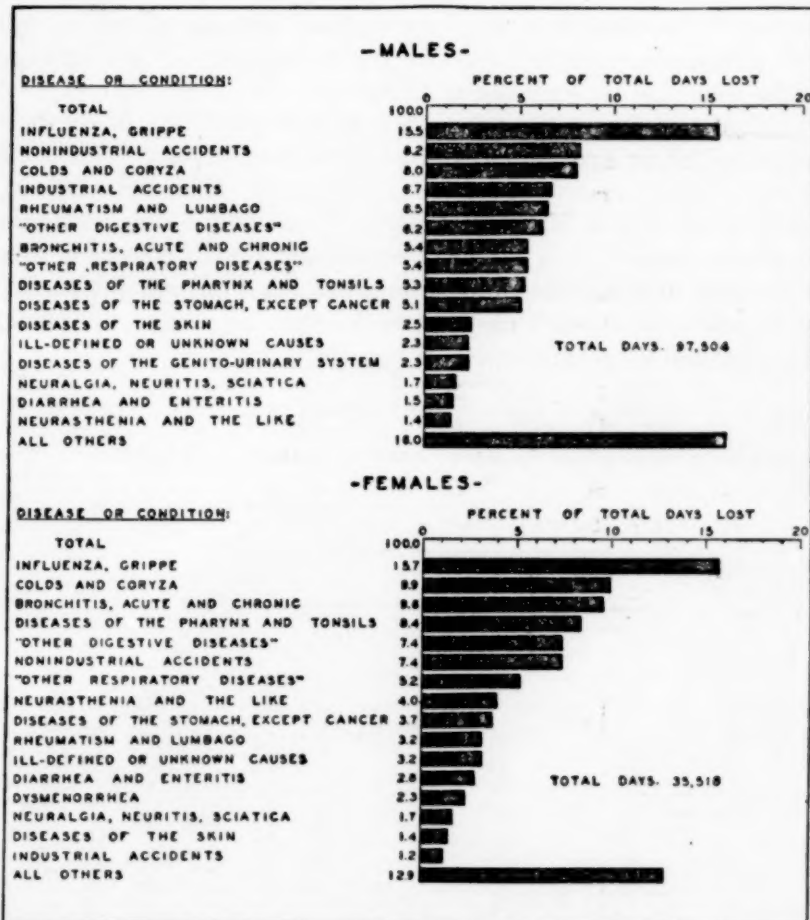


FIGURE 2.—Percentage of the total days of disability accounted for by different causes among employees of the Boston Edison Co., 1933 to 1937, inclusive.

and rheumatism and lumbago, 6.5 percent. Among female employees influenza and grippe was the cause of 15.7 percent of the total days of disability; colds and coryza, 9.9 percent; bronchitis, acute and chronic, 9.6 percent; and diseases of the pharynx and tonsils, 8.4 percent. Thus in both sexes influenza and grippe yields similar percentages and ranks definitely first in each instance.

Frequency of absences for, and percentage of total days of disability accounted for by, specific days and time intervals after onset of disability.—The frequency of absences from all sickness and injuries on the specific day of disability after onset through the twenty-first day of disability is shown, among other things, in table 6 and figure 3. The females show a higher incidence than the males throughout the first 3 weeks of disability; but as duration increases, the proportionate differences decrease. Although the males experienced 900.0 per 1,000 and the females 1,820.3 per 1,000, first-day absences, only 205.6 absences per 1,000 for males and 313.6 absences per 1,000 for females extended through the seventh day.

Table 6 also shows the percentage of the total days of disability accounted for by specific days after onset of disability. Thus 12.0 percent of the total days of disability in the case of the males occurred during the first day after onset while the corresponding percentage for the females is 16.8; it will be observed that the differences between the percentages for males and females become rapidly smaller as duration increases to the fifth day; thereafter the differences approximate zero, and finally become negative.

TABLE 6.—*Frequency of absences lasting 1 calendar day or longer due to all disabilities, and percentage of the total days of disability, by specific day after onset; experience of employees of the Boston Edison Co., 1933-37, inclusive*¹

Day of disability after onset	Annual number of absences ² per 1,000 persons				Percentage of total days of disability				Number of absences ²		Number of days ² of disability	
	Male		Female		Male		Female		Male	Female	Male	Female
	Daily	Cumulative	Daily	Cumulative	Daily	Cumulative	Daily	Cumulative				
1st.....	900.0	900.0	1,820.3	1,820.3	12.0	12.0	16.8	16.8	11,672	5,956	11,672	5,956
2d.....	695.3	1,595.3	1,226.8	3,047.1	9.2	21.2	11.3	28.1	9,017	4,014	9,017	4,014
3d.....	543.2	2,138.5	842.6	3,889.7	7.2	28.4	7.8	35.9	7,045	2,757	7,045	2,757
4th.....	415.4	2,553.9	613.7	4,503.4	5.5	33.9	5.7	41.6	5,387	2,008	5,387	2,008
5th.....	329.4	2,883.3	471.3	4,974.7	4.4	38.3	4.3	45.9	4,272	1,542	4,272	1,542
6th.....	262.1	3,145.4	384.2	5,358.9	3.5	41.8	3.5	49.4	3,399	1,257	3,399	1,257
7th.....	205.6	3,351.0	313.6	5,672.5	2.7	44.5	2.9	52.3	2,666	1,026	2,666	1,026
8th.....	153.1	3,504.1	231.7	5,904.2	2.0	46.5	2.1	54.4	1,986	758	1,986	758
9th.....	135.2	3,639.3	206.9	6,111.1	1.8	48.3	1.9	56.3	1,754	677	1,754	677
10th.....	121.7	3,761.0	184.3	6,295.4	1.6	49.9	1.7	58.0	1,578	603	1,578	603
11th.....	110.0	3,871.0	162.3	6,457.7	1.5	51.4	1.5	59.5	1,426	531	1,426	531
12th.....	99.5	3,970.5	147.0	6,604.7	1.3	52.7	1.4	60.9	1,291	481	1,291	481
13th.....	91.1	4,061.6	131.1	6,735.8	1.2	53.9	1.2	62.1	1,182	429	1,182	429
14th.....	83.4	4,145.0	119.8	6,855.6	1.1	55.0	1.1	63.2	1,081	392	1,081	392
15th.....	71.6	4,216.6	102.1	6,957.7	1.0	56.0	.9	64.1	929	334	929	334
16th.....	69.2	4,285.8	99.3	7,057.0	.9	56.9	.9	65.0	897	325	897	325
17th.....	67.2	4,353.0	96.9	7,153.9	.9	57.8	.9	65.9	872	317	872	317
18th.....	65.8	4,418.8	92.9	7,246.8	.9	58.7	.9	66.8	853	304	853	304
19th.....	63.7	4,482.5	89.9	7,336.7	.9	59.6	.8	67.6	826	294	826	294
20th.....	61.8	4,544.3	85.9	7,422.6	.8	60.4	.8	68.4	801	281	801	281
21st.....	59.2	4,603.5	82.5	7,505.1	.8	61.2	.8	69.2	768	270	768	270
372d.....	2.2	7,518.2	2.1	10,855.1	.03	100.0	.02	100.0	28	7	28	7
Total for 372 days..	900.0	-----	1,820.3	-----	100.0	-----	100.0	-----	11,672	5,956	97,504	35,518

¹ The number of days of disability is the number of calendar days from the date disability began to the date of return to work, or to the three hundred and seventy-second day, inclusive.

² For a specific day, the number of absences is the same as the number of persons absent, and the number of days absent, respectively.

Number of person-years of membership: Males, 12,969; females, 3,272.

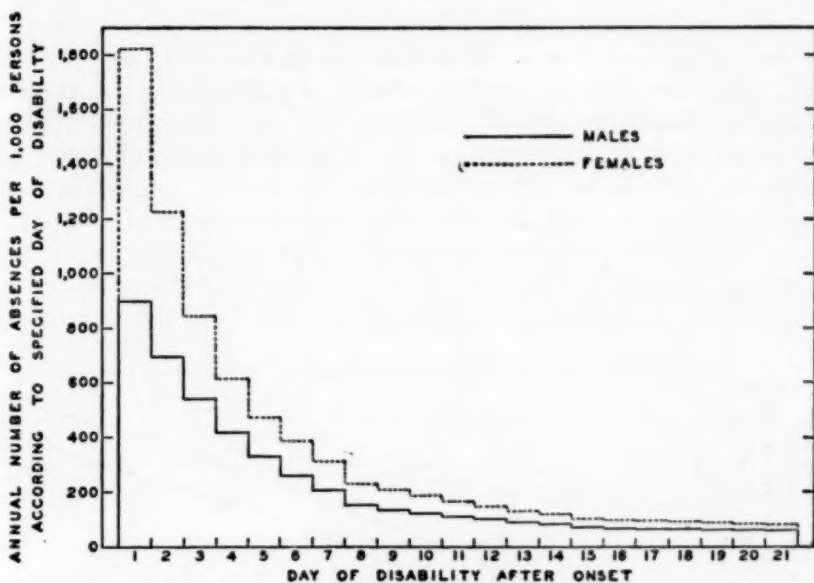


FIGURE 3.—Annual number of absences per 1,000 persons according to specified day of disability after onset among employees of the Boston Edison Co., 1933 to 1937, inclusive. For a specific day, the number of absences is the same as the number of persons absent, and the number of days absent, respectively. (Compare fig. 4.)

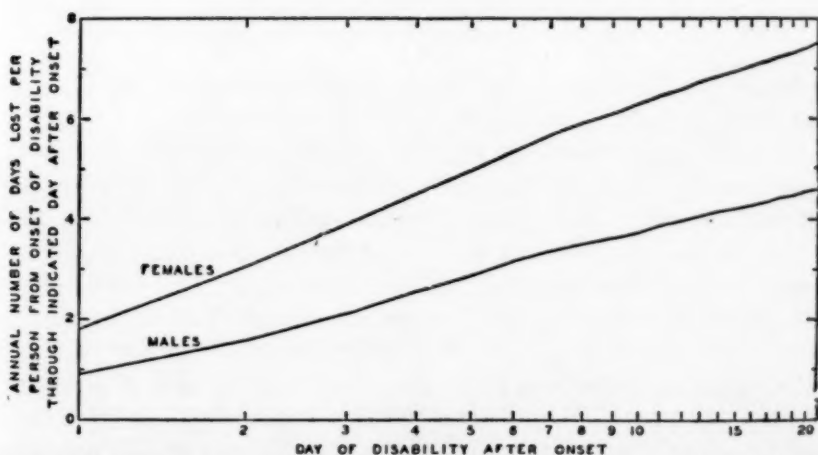


FIGURE 4.—Annual number of days lost per person from onset of disability through indicated day after onset among employees of the Boston Edison Co., 1933 to 1937, inclusive. (Logarithmic horizontal scale.) (Compare Perrott (5), fig. 5.)

The cumulative daily frequencies and cumulative daily percentage of days of disability may also be observed in table 6. It will be seen, for example, that on the seventh day after onset the cumulative daily frequency among males was 3,351.0 per 1,000, and among females, 5,672.5 per 1,000. Furthermore, of the total days of disability, approximately 45 percent among the males and 52 percent among the females occurred during the first 7 days after onset of sickness or injury. Figures 4 and 5 may be used to determine approximately for any chosen interval of time the annual number of days lost per person and the percentage of the total days of disability. Thus, if the interval included by the eighth and twelfth days is selected, it is necessary only to subtract the cumulative daily frequency or the cumulative daily percentage for the seventh day from the correspond-

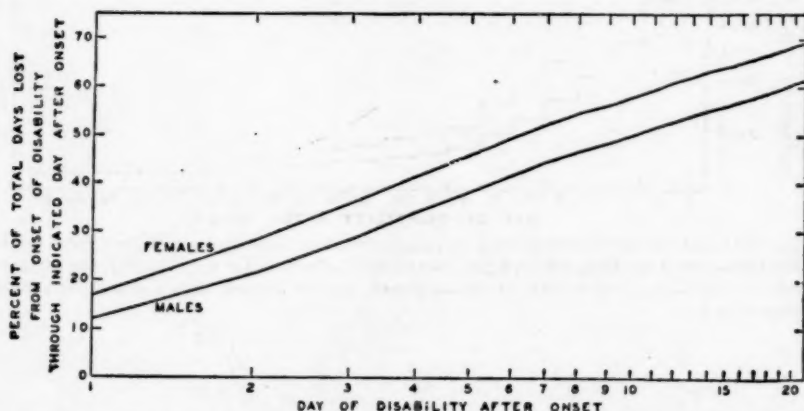


FIGURE 5.—Percentage of total days lost from onset of disability through indicated day after onset among employees of the Boston Edison Co., 1933 to 1937, inclusive. (Logarithmic horizontal scale.)

ing figure for the twelfth day; more precise results may be obtained from table 6, upon which figures 4 and 5 are based.

Disability by occupational groups.—Figure 6 shows the frequency of absences by occupational group in decreasing order of magnitude. The highest rates during the 5 years ending December 31, 1937, among the male employees are shown for linemen (1,403.8), meter readers (1,229.5), repairmen (1,140.4), helpers (1,119.3), and chauffeurs (1,091.7). During the 5-year period, installers averaged one absence per person per year. The other occupational groups shown in the figure averaged less than one absence on account of disability per man per year. Troublemakers (542.9), engineers (584.1), division heads, assistants, and subdivision heads (648.6), and station operators (663.9) had comparatively low rates of absences due to disability.

The rate for all female employees during the 5-year period (1,820.3) was over twice the rate for male employees (900.0) during the same period. Office cleaners averaged approximately 3 absences per person

per year. The rate for female clerks (1,832.6) was almost twice the rate for male clerks (953.6). Telephone operators among the females (rate of 911.8 per 1,000) experienced a slightly lower rate than male telephone operators (935.1).

Specific disabilities by occupational group among the males.—Table 7 shows the frequency of, time lost from, and severity of, specific disabilities for males in selected occupational groups. As previously

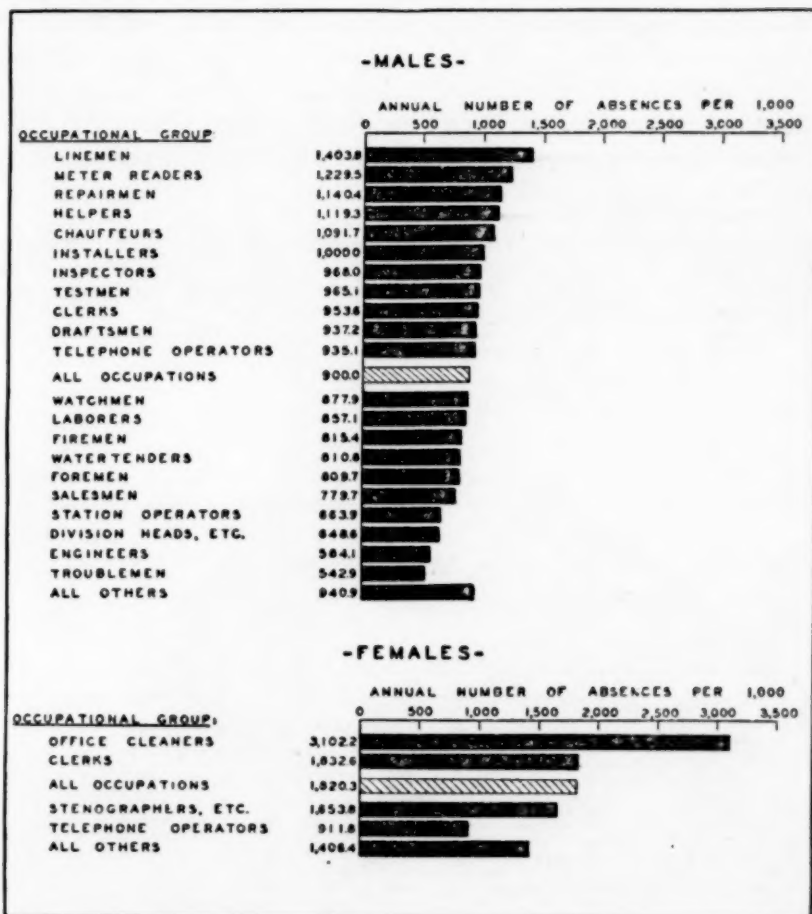


FIGURE 6.—Annual number of absences per 1,000 persons according to occupational group among employees of the Boston Edison Co., 1933 to 1937, inclusive.

stated, linemen experienced the highest rate of absences; they also show the highest average number of disability days, namely, 11.1 per person per year as against 7.5, the average for all occupations. Among the linemen the average annual number of disability days per person from industrial accidents, 2.8, nonindustrial accidents, 1.2, and respiratory diseases, 4.8, were greater than the corresponding rates yielded by the other occupational groups selected for comparison.

Meter readers are the next highest group in respect of incidence (1,229.5); but the group stands fourth from the top in the annual number of days of disability per person (8.0), the rate being exceeded by linemen, repairmen, and inspectors. Repairmen, with an average or 1,140.4 absences per 1,000, were disabled 9.7 days per person per year. Nonrespiratory, nondigestive diseases caused more days of disability per person per year (3.4) among this group than among any of the other occupational groups listed. Inspectors, with an average of less than one absence per person per year (968.0 per 1,000), were disabled on an average of 9.3 days per person per year. Of these days of disability 1.7 were due to industrial accidents. Salesmen and station operators show the lowest incidence rates as well as the lowest time-lost rates, the latter rates being 4.4 and 6.2 days per person per year, respectively.

TABLE 7.—*Frequency of absences lasting 1 calendar day or longer due to sickness and accidents, annual number of days of disability per person, and average number of days per absence, for specific occupational groups, by cause; experience of MALE employees of the Boston Edison Co., 1933-37, inclusive*¹

Diseases and conditions causing disability	Occupational groups						
	Line-men	Meter readers	Re-pair-men	In-spectors	Clerks	Sales-men	Station operators
Annual number of absences per 1,000 males							
All disabilities.....	1,403.8	1,229.5	1,140.4	968.0	953.6	779.7	663.8
Industrial accidents.....	66.9	69.8	38.6	29.7	1.5	5.8	0
Nonindustrial accidents.....	64.9	49.9	43.2	43.4	55.2	35.1	45.0
Sickness.....	1,272.0	1,109.8	1,058.6	894.9	896.9	738.8	618.2
Respiratory diseases.....	878.7	696.6	652.8	600.4	602.3	540.0	390.2
Digestive diseases.....	190.4	183.6	166.6	157.5	164.7	76.0	145.9
Nonrespiratory, nondigestive diseases.....	202.9	229.6	239.2	137.0	129.9	122.8	82.1
Annual number of days per male							
All disabilities.....	11.113	7.976	9.681	9.349	7.032	4.441	6.106
Industrial accidents.....	2.787	.894	1.224	1.701	.080	.039	0
Nonindustrial accidents.....	1.157	.531	.424	.562	.578	.291	.501
Sickness.....	7.169	6.551	8.033	7.086	6.434	4.111	5.695
Respiratory diseases.....	4.706	3.704	3.465	3.774	3.195	2.957	2.297
Digestive diseases.....	.962	1.174	1.168	.879	.724	.310	.647
Nonrespiratory, nondigestive diseases.....	1.441	1.673	3.400	2.433	2.515	.844	2.751
Average number of days per absence							
All disabilities.....	7.92	6.49	8.49	9.66	7.37	5.70	9.23
Industrial accidents.....	41.63	12.80	31.72	57.31	14.09	6.67	0
Nonindustrial accidents.....	17.84	10.64	9.82	12.95	10.47	8.28	10.93
Sickness.....	5.64	5.90	7.59	7.92	7.17	5.56	9.21
Respiratory diseases.....	5.42	5.32	5.31	6.29	5.30	5.43	5.89
Digestive diseases.....	5.05	6.39	7.01	5.58	4.40	4.08	4.43
Nonrespiratory, nondigestive diseases.....	7.10	7.29	14.21	17.77	19.36	6.87	33.51
Person-years of membership.....	478	501	648	438	1,378	513	1,425

¹ The number of days of disability is the number of calendar days from the date disability began to the date of return to work, or to the three hundred and seventy-second day, inclusive.

Italicized rates are based on less than 5 cases.

The days of disability per absence or the severity rate for all causes ranged from 9.7 days per case for inspectors to 5.7 for salesmen. The average number of days per absence due to respiratory diseases shows slight differences among the occupational groups; however, the average days per absence for nonrespiratory, nondigestive diseases varies from 33.5 days for station operators to 6.9 for salesmen.

TABLE 8.—Frequency of absences lasting 1 calendar day or longer due to sickness and accidents, annual number of days of disability per person, and average number of days per absence, for specific occupational groups, by cause; experience of FEMALE employees of the Boston Edison Co., 1933-37, inclusive ¹

Diseases and conditions causing disability (with corresponding title numbers in parentheses from the International List of Causes of Death, fourth revision, Paris, 1929)	Annual number of absences per 1,000 females			Annual number of days per female			Average number of days per absence		
	Clerks	Stenographers, typists, etc.	Office cleaners	Clerks	Stenographers, typists, etc.	Office cleaners	Clerks	Stenographers, typists, etc.	Office cleaners
All disabilities.....	1,832.6	1,653.8	3,102.2	10,715	10,678	15,896	5.85	6.45	5.12
Industrial accidents.....	3.1	0	14.6	.025	0	.044	7.88	0	3.00
Nonindustrial accidents.....	74.1	81.7	175.2	.879	.563	.942	11.86	6.88	5.38
Sickness.....	1,755.4	1,572.1	2,912.4	9,811	10,115	14,912	5.59	6.43	5.16
Respiratory diseases.....	943.9	976.0	1,408.8	5,174	5,019	8,686	5.48	5.14	6.17
Digestive diseases.....	304.6	225.9	510.9	1,641	.817	1,788	5.39	3.62	3.50
Nonrespiratory, nondigestive diseases.....	506.9	370.2	992.7	2,996	4,279	4,438	5.91	11.56	4.47
Rheumatism, lumbago (56, 57, 156b).....	33.3	43.3	189.8	.247	1,240	1,598	7.42	28.67	8.42
Neurasthenia and the like (part of 87b).....	33.3	52.9	29.2	.462	.851	.065	13.88	16.09	3.25
Dysmenorrhea (139c).....	168.2	91.4	29.2	.265	.154	.044	1.58	1.68	1.50
Diseases of the skin (151-153).....	25.9	28.8	21.9	.157	.192	.066	6.06	6.67	5.00
All other diseases and conditions.....	246.2	153.8	722.6	1,865	1,842	2,635	7.57	11.97	3.65
Person-years of membership.....	2,551	208	137	2,551	208	137	2,551	208	137

¹ The number of days of disability is the number of calendar days from the date disability began to the date of return to work, or to the three hundred and seventy-second day, inclusive.

Italicized rates are based on less than 5 cases.

Specific disabilities by occupational group among the females.—As may be observed from table 8, the annual frequency of absences per 1,000 female clerks was 1,832.6; stenographers, typists, etc., 1,653.8; and office cleaners, 3,102.2, with an average loss per absence of 5.9, 6.5, and 5.1 days, respectively. The average number of days of disability per person per year for clerks was 10.7; for stenographers, typists, etc., 10.7; and for office cleaners, 15.9.

The office cleaners experienced higher frequency rates than the clerks, or the stenographers, typists, etc., for all diseases and conditions with the exception of neurasthenia and the like, dysmenorrhea, and diseases of the skin. Rheumatism occurred from four to five times as often among office cleaners as among the other two groups, and dysmenorrhea one-third to one-fifth as often, indicating that the cleaners were composed of persons of older ages.

SUMMARY

The Boston Edison Company during the 5-year period 1933 to 1937, inclusive, reported 17,628 absences causing 133,022 days of disability. These were yielded by 12,969 male and 3,272 female person-years of life in the company.

While the frequency of all disabilities showed no definite decline from year to year, the average number of days lost per person per year and the average number of days per absence showed a perceptible downward trend.

The frequency of absences from all disabilities lasting one calendar day or longer was 900.0 per 1,000 males, with an average of 7.5 days of disability per male per year; the female rate, on the other hand, was 1,820.3 per 1,000, with an average of 10.9 days of disability per female per year. The average number of days per absence was 8.4 among the males and 6.0 among the females.

Influenza and grippe accounted for 15.5 percent of the total days of disability for the males and 15.7 for the females.

Approximately 45 percent of the days of disability among the males occurred during the first 7 days after onset of disability; the corresponding percentage for the females was 52.

Linemen, meter readers, and repairmen experienced the highest incidence rates for males. Among the female employees, office cleaners and clerks, respectively, exceeded the stenographers, typists, etc.

ACKNOWLEDGMENT

Acknowledgment is made to the Boston Edison Co. for forwarding to the Division of Industrial Hygiene monthly reports from which the data from this paper were obtained, and to Mr. Herbert W. Moses, superintendent, Industrial Relations, for his cooperation.

REFERENCES

- (1) Brundage, D. K.: (1927) A 10-year record of absences from work on account of sickness and accidents. Experience of employees of the Edison Electric Illuminating Company of Boston [Boston Edison Company], 1915 to 1924, inclusive. *Pub. Health Rep.*, **42**: 529-550. (Reprint no. 1142.)
- (2) ———: (1928) Sickness among persons in different occupations of a public utility. *Ibid.*, **43**: 314-335. (Reprint no. 1207.)
- (3) ———: (1928) Trend of disabling sickness among employees of a public utility. *Ibid.*, **43**: 1957-1984. (Reprint no. 1239.)
- (4) U. S. Department of Commerce, Bureau of the Census: Fifteenth Census of the United States, 1930. Population, v. 5, General Report on Occupations. Government Printing Office, Washington, D. C. Pp. 138-139 (1933).
- (5) Perrott, G. St. J.: The state of the Nation's health. *Annals Am. Acad. Pol. and Soc. Sc.* Pp. 11-12 of reprint. (November 1936).

ANTAGONISM BETWEEN SPECIES OF MALARIA PARASITES IN INDUCED MIXED INFECTIONS *

(Preliminary Note)

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Malaria is now widely used in the treatment of neurosyphilis. Any new information as to the mode of action of any species or combination of species in induced malaria is obviously of interest.

In the past it has been the practice at this hospital (State Hospital, Columbia, S. C.) to use tertian malaria in the treatment of white paretics only. Quartan malaria was used in the treatment of Negroes, inasmuch as many of them show an immunity to tertian. In August 1937 these two species were combined to find whether any advantage would result from a mixed infection.

Two methods of inoculation were used. One was to inject 5 cc of 1 percent dextrose defibrinated blood. The defibrinated blood was used when blood was drawn to ship to cooperating physicians and hospitals. However, when only enough material to inoculate local patients was needed immediately, 5 to 10 cc of whole blood was used. In both methods the injection was made intravenously and the results were satisfactory.

The present report covers 16 white and 4 Negro paretic patients who have completed the course of malaria therapy.

The four Negro patients developed only *Plasmodium malariae* infections. This is not surprising in view of the intolerance which the Negro shows to the *Plasmodium vivax*. One of the 16 white patients developed quartan only, 3 tertian only, and 12 showed both types.

Of the 12 patients showing both species, 9 showed *P. vivax* to be dominant. The policy of injecting *P. malariae* first followed later by *P. vivax* was adopted when the first cases indicated that *P. vivax* usually dominated over *P. malariae*. In the 9 cases in which *P. vivax* predominated over *P. malariae*, the sequence of events was similar in all. Usually the parasite of quartan malaria appeared and began to cause typical quartan paroxysms; then the *P. vivax* began to appear, increasing rapidly in numbers. For a few days both species caused paroxysms. However, the *P. malariae* began to decline rapidly in numbers and presumably in effects, and the paroxysms became typically tertian or quotidian. In 3 of the 9 cases, after the ascension of the *P. vivax*, the *P. malariae* disappeared from the blood stream and did not reappear. Subinoculation did not produce parasites or symptoms of quartan malaria.

*Contribution from the Williams Malaria Research Laboratory, Field Investigations of Malaria, National Institute of Health, located at the State Hospital, Columbia, S. C.

In 3 cases which showed both species, *P. malariae* dominated over *P. vivax*. In 2 of the 3 cases the *P. vivax* disappeared completely microscopically. Several subinoculations made from one case never revealed *P. vivax*.

Infections by either of these species when given alone, before or after these studies had been started, resulted in typical regular paroxysms characteristic of that single species.

In the mixed infections both species appeared to share responsibility for a few paroxysms when large numbers of both parasites were present. The paroxysms resulting from the simultaneous sporulation from two species did not seem to be more severe clinically than paroxysms caused by one species.

Infections caused by a single species ran over a long period of time or until terminated by quinine. In contrast, in the mixed infections soon after both species had attained large numbers in the blood, one species began to decrease in numbers and clinical effects. The paroxysms became typical of the remaining dominant species. In two cases *P. malariae* had disappeared 13 days after the first appearance of *P. vivax*.

DISCUSSION

These phenomena demonstrate an incompatibility between *P. vivax* and *P. malariae* when both species are present in the peripheral circulation. This seeming antagonism has been noticed by others, who detected a predominance of one species over another. Morishita (1) believed that any species in a mixed infection might act as a suppressor of the other species. James (2) suggested that the paucity of concurrent mixed infections was because one species very quickly dominated and the other disappeared, until the attack of the predominant species was over. He thought that *P. vivax* dominated over *P. malariae* and *P. falciparum*. Mayne and Young, in an unpublished preliminary report, presented at the meeting of the Southern Medical Association in December 1937, on the first eight cases of this series suggested an antagonism between *P. vivax* and *P. malariae*. At that time it seemed as if *P. vivax* was usually the predominant form. Later, Boyd and Kitchen (3) found that, in two cases infected with *P. falciparum* and *P. vivax*, *P. falciparum* rapidly diminished in numbers upon the ascension of *P. vivax*.

The mechanism of the antagonistic action is not clearly understood at present. If *P. vivax* always dominated over *P. malariae* it would appear as if the former exerted some specific action upon the quartan malaria. However, this reasoning is not upheld, because in three cases it was found that *P. malariae* became dominant over *P. vivax*.

A phagocytic activity that becomes highly specific against one of the species should be considered. In this connection, however, it must be pointed out that infections caused by a single species run a much longer course than any of the mixed infections without being depleted by phagocytic activity.

It is quite evident that the tendency of one species to dominate in mixed infections might serve to mask natural mixed infections. Therefore, it is suggested that the figures given for mixed infections in field surveys where only a few smears of each person are taken are probably lower than the true rate and that many cases of mixed infections are present when only one species is noticed.

SUMMARY AND CONCLUSIONS

1. This is a preliminary report on the effects of combining *P. vivax* and *P. malariae* for treatment of paretics. Of 16 white patients, 12 demonstrated the presence of both species, whereas 4 developed only one species.

2. It was observed that when both species of parasites appeared in the peripheral blood stream concomitantly, one rapidly became predominant and the other tended to disappear. There is an apparent antagonistic action of one species against the other.

3. In the mixed infection of *P. vivax* and *P. malariae* the predominant species is not always the same. Of 12 mixed infections, 9 showed *P. vivax* as predominant while 3 showed *P. malariae*.

4. Owing to the suppression of one species by the predominant species it seems evident that there are many more cases of mixed infections than are actually reported, especially in surveys in the field under normal conditions, where only a few examinations are made.

ACKNOWLEDGMENTS

The authors wish to acknowledge the assistance of Medical Technician W. P. Greenwood in this work. They also express their appreciation to the staff of the South Carolina State Hospital for their cooperation.

REFERENCES

- (1) Morishita, Kaoru: Notes on mixed malarial infection, with special reference to antagonism among different species of malarial parasites, and their segregation by the use of special drugs. *J. Med. Assoc. of Formosa*, **30** (9) (1931).
- (2) James, S. P.: Some general results of a study of induced malaria in England. *Trans. Roy. Soc. Trop. Med. and Hyg.*, **24**: 477-538 (1931).
- (3) Boyd, Mark, F., and Kitchen, S. F.: Simultaneous inoculation with *Plasmodium vivax* and *Plasmodium falciparum*. *Am. J. Trop. Med.*, **17**: 855-861 (1937).

TOXICOLOGY OF PHENYLDICHLORARSINE

II. RESPONSE OF MAN TO PDA-OIL MIXTURES¹

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Experimental studies (1, 2, 3) have shown that approximately 1 percent mixtures of phenyldichlorarsine (commonly abbreviated PDA) in medium or heavy petroleum distillates are efficient wood preservatives because of the fungicidal properties of the arsenical compounds present. Since the commercial use of PDA-oil mixtures as wood preservatives will create many possibilities for human contact with this material, experiments were carried out to determine what effect PDA-oil mixtures have on human skin and how injurious effects may be prevented.

In a previous paper (4) it has been shown that when PDA is mixed with medium and heavy petroleum distillates in concentrations of 1 percent by weight, the resulting mixture is extremely vesicant when applied to the skin of rabbits, approximately 0.02 cc of the mixture producing burns. In general, the heavy, more viscous oil tended to localize the burn, giving a small but more severe reaction. The lighter oil gave a burn of less intensity but covered a greater area. That part of the investigation described in the earlier paper was confined to the response of experimental animals on exposure to vapors of PDA, as well as the results of skin application of undiluted PDA and various PDA-oil mixtures. In the present report the response of men to skin applications of PDA-oil mixtures is described. As the result of additional animal experimentation, and tests on men, a possible method of protection and prevention is suggested.

I. VESICANT ACTION OF PDA-OIL MIXTURES

The oils used in preparing the PDA-oil mixtures were two types of petroleum distillates. Oil No. 208, a gas oil, flash point (open cup), 150° F.; Robinson color No. 8; Saybolt Universal viscosity at 100° F., 35-45; final boiling point, 725° F. Oil No. 1608, a heavy fuel oil, flash point (open cup), 325-340° F.; gravity (A. P. I.), 19.5-21.5; Robinson color, black; Saybolt Universal viscosity at 100° F., 700-725, at 210° F., 60-65.

Solutions of PDA, 0.1 percent, 0.5 percent, and 1.0 percent by weight, in each oil, were prepared by adding measured amounts of PDA to known weights of the oil.

In testing the vesicant action of the PDA-oil mixtures on men, a small drop (approximately 0.02 cc) was applied to an area on the fore-

¹ From the Division of Industrial Hygiene, National Institute of Health. The preceding article of this series is as follows: Toxicology of Phenyldichlorarsine. I. Experiments with animals. By H. C. Dudley and B. F. Jones. Pub. Health Rep., 53: 338 (Mar. 4, 1938).

arm of the subject. No preliminary treatment preceded the application.

(A) RESULTS OF APPLICATION OF 0.1 PERCENT AND 0.5 PERCENT
PDA-OIL MIXTURES

About 0.02 cc of these PDA-oil mixtures were applied to the forearms of three men. These mixtures contained 0.1 percent and 0.5 percent by weight PDA. The oils containing no PDA were applied as controls.

In no case did the controls or the 0.1 percent PDA-oil mixtures give reactions. The 0.5 percent PDA in oil No. 208, gas oil, gave no reaction, apparently because the oil spread over an area 1 inch or more in diameter. The heavier fuel oil, No. 1608, with 0.5 percent PDA, caused definite reactions on all three subjects tested. In two, a slight itching and redness resulted, which cleared within 24 hours. However, on one of the men tested, small vesicles resulted in 24 hours, with swelling. After 5 days, slight hardening of the area with brown pigmentation was noted.

(B) RESULTS OF APPLICATION OF 1 PERCENT PDA-OIL MIXTURES

When a drop (about 0.02 cc) of 1 percent PDA-oil mixture, prepared freshly from oil No. 208, was applied to the forearms of five men, but one person showed redness in 4 hours, which lasted 24 hours. No blisters, vesicles, or pigmentation resulted. Four of the subjects gave no subjective or objective symptoms.

In table 1 is shown the reaction resulting from the application of a drop of 1 percent PDA-oil No. 1608 mixture to the forearm of six individuals. Of this number, one showed no reaction, three showed slight to moderate reactions, and two received rather severe burns.

TABLE 1.—*Effects of application of 1 percent PDA in oil No. 1608 to man*

Subject No.	Effect
1.....	Soreness, erythema, and swelling to 48 hours. Small vesicles. No pigmentation.
2.....	Soreness, erythema, and swelling to 48 hours. Many small vesicles. Brown pigmentation.
3.....	Very slight soreness and erythema at 24 hours. Negative at 48 hours.
4.....	Erythema, soreness, and swelling to 24 hours. Small vesicles at 48 hours. Slight pigmentation.
5.....	Soreness, erythema, and slight swelling at 24 hours. 48 hours negative.
6.....	Negative. No reaction.

II. METHODS OF PREVENTING SKIN REACTIONS RESULTING FROM
CONTACT WITH PDA-OIL MIXTURES

In order to determine a practical method of preventing the vesicant action of PDA-oil mixtures a series of animal experiments was carried out in which rabbits were used as test animals. These tests were of a preliminary character but showed that, by removing the PDA-oil

mixtures with warm water and mild soap within 30 minutes, the irritation and vesication caused by such application could be markedly reduced or prevented entirely.

Another series of skin tests made with rabbits showed that application of a salve made from equal parts of petrolatum jelly and freshly precipitated basic ferric hydroxide would prevent serious burns on rabbits. This salve is efficient only when applied on the skin in a thin continuous layer before application of the 1 percent PDA-oil mixtures. If the salve is applied to the area 30 minutes after application of the oil mixtures there is but slight lessening of the vesicant action.

A series of tests with the oil mixtures was carried out on men in order to extend the previously described experiments.

In table 2 is given a description of the reactions obtained when 10 men were tested with a mixture of 1 percent by weight PDA in oil No. 1608, a heavy fuel oil. A drop of the oil mixture was applied to each of four areas on the forearm of these individuals. One of the applications was removed by washing with warm water and mild toilet soap (white, floating, Federal Specification P-S-616) 30 minutes after applying, one was removed by the same method 60 minutes after application, another was washed 2 hours after application, while the fourth was left intact. As a control, a drop of the oil, No. 1608 (without PDA), was applied to the forearm and was not removed. The effects of these treatments were recorded and are shown in table 2. Since the reactions produced by the oil removed after 2 hours and the oil mixture that was left intact were identical, these two series of data are combined in table 2 for the sake of brevity. In no case did the controls, application of oil No. 1608, produce any reactions.

In certain cases the same persons were used in these tests as were used in the previous tests the results of which are summarized in

TABLE 2.—*Removal of oil mixtures (1 percent PDA-oil No. 1608) by toilet soap and warm water. (Soap—white, floating. Federal Specification P-S-616)*

Subject No.	Effects, oil mixture washed off—minutes after application with mild toilet soap and warm water		
	30 minutes	60 minutes	120 minutes or more
7	Erythema, marked vesication.	Erythema, small vesicles....	Erythema, small vesicles.
2	Erythema, small vesicles....	Erythema, soreness, small vesicles.	Erythema, soreness, small vesicles.
4	Negative.....	Negative.....	Slight erythema. Clear at 24 hours.
1	do.....	do.....	Do.
5	do.....	do.....	Negative.
8	do.....	Very slight erythema.....	Slight erythema.
9	do.....	Negative.....	Negative.
10	Marked erythema.....	Marked painful reaction. Vesicles.	Marked painful reaction. Vesicles.
11	Negative.....	Slight erythema.....	Marked erythema and slight swelling.
6	do.....	Negative.....	Negative.

NOTE.—In no case did the oil No. 1608 (without PDA) give skin reactions.

table 1. The corresponding reactions may be determined by comparing these tables, since the subjects were assigned the same numbers in both series of tests.

As the result of these tests it is shown that the primary vesicant action of 1 percent PDA-oil mixtures in most cases may be materially reduced by thorough washing with toilet soap and water within 30 minutes. It must be emphasized that persons who are susceptible to the immediate vesicant action ² of PDA receive burns although the oil mixture is removed within 30 minutes. As will be shown later in this paper, there is evidence that there is a delayed effect which is apparently in no way connected with the primary vesication produced by the PDA-oil mixtures. This effect was not prevented by washing with soap and water.

In order to determine further the efficiency of the petrolatum jelly-ferric hydroxide salve as a protective measure, two men were used to test its efficiency. To an area on the forearm of these (subjects No. 1 and No. 7) individuals, a drop of 1 percent PDA-oil No. 1608 mixture was applied. To a second area, which had been treated with the ferric hydroxide salve (previously described), a drop of the oil mixture was applied as before, and to a third area, which had been treated with petrolatum jelly, a drop of the oil mixture was likewise applied.

The ferric hydroxide paste coating the area of application prevented any reaction in the case of subject No. 1, while the petrolatum jelly coating caused only slight lessening of the vesicant action. Erythema and slight swelling occurred on the unprotected area. If tables 1 and 2 are examined it will be seen that subject No. 1 may be classed as average in his response to the vesicant action of PDA.

In the case of subject No. 7, both the area to which no coating had been applied and that coated with petrolatum jelly showed large vesicles in 24 hours. The area coated with the ferric hydroxide paste showed slight erythema, with slight swelling and no vesicles. Subject No. 7 is classed as moderately susceptible to the action of PDA in the light of other experiments.

As the result of the experiments with animals and the two men mentioned, it seems clear that a ferric hydroxide salve or paste made from equal parts of petrolatum jelly and freshly precipitated basic ferric hydroxide paste will prove helpful in preventing serious skin lesions in the majority of individuals.

The reaction which was produced by application of a 1 percent PDA-oil No. 1608 mixture to the arm of subject No. 10 (see table 2) is shown in figure 1. This photograph was taken 48 hours after applying the oil mixture to the forearm of the individual.

² Rabbits have been used as test animals for determining the vesicant action of the PDA-oil mixtures as they are very susceptible to the action of these materials. Rabbits have been found to give a constant reaction, the reaction corresponding markedly in severity with the reaction produced in the case of the more susceptible men.

The objective symptoms included swelling, erythema, and marked vesiculation. The subject described an intense burning and itching which persisted for four days. Clearing took place after the fourth day, followed by brown pigmentation and thick scab formation.

Although the initial reaction of subject No. 10 was more severe than the usual case, the same general course is observed in all those persons exhibiting moderate to marked reactions.

III. ACTION OF WOOD IMPREGNATED WITH PDA-OIL MIXTURES

Commercially prepared oil mixtures, made from oil No. 208 and oil No. 1608, containing 0.06 pounds PDA per gallon (approximately 0.75 percent), were used in treating wood samples (hot pressure process).

Oil remaining on the surface of these samples was found to produce burns on rabbits. However, it was found that, when chips (free from excess surface oil) cut from the impregnated wood were taped to clipped areas on the backs of rabbits and left in contact for 4 hours, in no case did irritation occur (4).

Portions of unweathered wood samples used in these tests were cut (across grain) into blocks 1 inch by 1 inch by $\frac{1}{8}$ inch, freed from surface oil, and then taped to the forearm of six men. Patches were allowed to remain in contact with the skin for 1 hour. There was little or no reaction to these tests in any case. One person who in other tests showed marked reactions to PDA oil-mixtures showed no reaction to these tests.

When samples of yellow pine blocks, 1 inch by 1 inch by 10 inches, which had been treated by the Rueping process (see note to table 3) were treated so as to cause "sweating" of the impregnating oil-PDA mixture, in most cases little oil was obtained. The samples were heated overnight in a drying oven at 105° C. The oil which came to the surface after this treatment was scraped off and applied to the skin of rabbits. In no case was irritation or vesication produced.

Wood samples which had received various impregnating treatments were cut in blocks $\frac{1}{2}$ inch by $\frac{1}{4}$ inch by $\frac{1}{8}$ inch. The blocks were covered with 50 cc of solvent and allowed to remain at room temperature for 24 hours. The solvent was then filtered and an additional 50 cc of solvent were used as a rinse for extraction flask and filter funnel. The combined solvent fractions were then evaporated at room temperature for 24 hours. The extracted oil mixture was then applied to the skin of rabbits. Two series of skin tests were made, using the extracts obtained by treating the wood samples, as previously indicated, with acetone (C. P.) and petroleum ether (benzin, B. P. 30°-60° C.). As controls, oil mixtures containing 1 percent PDA were dissolved in the solvents and evaporated, and the oil was then applied to the skin of rabbits. Samples of untreated wood blocks

(yellow pine) were extracted as above and the extracts likewise tested for vesicant properties. The results are shown in table 3.

As the result of the skin tests on rabbits of the oils extracted from the treated wood samples, it is concluded: (a) That PDA-oil mixtures remaining in impregnated wood products which have been treated by the regular Rueping process, but followed by no hot-water or steam aftertreatment, are potentially a hazard due to the vesicant properties of the oil mixture contained in the body of the wood; (b) that wood products which have been treated with oil mixtures containing approximately 1 percent PDA, by the Rueping process, followed by a steam or hot water treatment, do not appear to constitute a hazard, since the oil contained in the body of the wood is no longer vesicant.³

TABLE 3.—*Vesicant properties of extracts from wood samples treated with PDA-oil mixtures*

Sample	Treatment	Solvent	Effect of extract on skin of rabbit
Controls:			
Oil No. 1608 plus 1 percent PDA.....	{ Oil treated with solvent. Solvent evaporated at room temperature.	Acetone.....	Severe burn.
		Benzin.....	Moderate burn.
Oil No. 208 plus 1 percent PDA.....	{ do.....	Acetone.....	Severe burn.
		Benzin.....	Do.
Untreated yellow pine blocks.....	{ Cut into blocks ½ inch by ¼ inch by ¼ inch; extracted with cold solvent for 24 hours; solvent evaporated at room temperature; residue applied to skin of rabbits.	Acetone.....	No effect.
		Benzin.....	Do.
Pine blocks treated by Rueping process, ¹ oil No. 1608, unweathered. ²	As for untreated pine blocks. (See above.)	Acetone.....	Slight to moderate burn.
		Benzin.....	Do.
Pine blocks treated by Rueping process, oil No. 1608, weathered 3 weeks.	{ do.....	Acetone.....	Slight irritation.
		Benzin.....	No reaction.
Pine blocks treated by Rueping process, oil No. 208, unweathered.	{ do.....	Acetone.....	Slight irritation.
		Benzin.....	No reaction.
Pine blocks treated by Rueping process, oil No. 208, weathered 3 weeks.	{ do.....	Acetone.....	Do.
		Benzin.....	Do.
Pine blocks pretreated with wet steam 20 minutes, followed by Rueping process, oil No. 1608.	{ do.....	Acetone.....	Slight burn.
		Benzin.....	Irritation.
Pine blocks treated by Rueping process, oil No. 1608, followed by treatment with wet steam for 15 minutes.	{ do.....	Acetone.....	No reaction.
		Benzin.....	Do.
Pine blocks treated by Rueping process, oil No. 1608, followed by treatment with dry steam for 15 minutes.	{ do.....	Acetone.....	Do.
		Benzin.....	Do.
Pine blocks treated by Rueping process, oil No. 1608, followed by submersion in boiling water 15 minutes.	{ do.....	Acetone.....	Do.
		Benzin.....	Do.

¹ Rueping empty cell process consists of the following steps:

- Wood subjected to air pressure increasing to 40 pounds gage over a 15-minute interval, specimens heated by enclosed steam coils to 135° F.
- Oil solution (containing 0.06 pound PDA per gallon) at 165° F. run into cylinder at above pressure.
- Pressure increased to and held at 100 pounds gage for 20 minutes, temperature maintained at 165° F.
- Residual oil solution drawn off at gage pressure of 10-20 pounds.
- Vacuum of 28 inches (Hg) then applied for 5 minutes.

² The skin effects of the extracts from unweathered wood samples which had been oven-dried before the impregnating treatment were identical to those produced by extracts of the air-dried samples (containing 10-15 percent moisture).

³ Experience in this laboratory has shown that PDA-oil mixtures which have remained in glass containers for several months do not in any way lose their vesicant properties.

IV. DELAYED ACTION OF PDA-OIL MIXTURES

In the tests previously described, 16 individuals were used. Of this number, three showed marked initial skin reactions, seven gave no initial subjective or objective symptoms, while six showed varying degrees of reaction from moderate to slight.

In two of the individuals there resulted a delayed reaction, which made its appearance 5 to 15 days after the application of the PDA-oil mixture.

In the case of subject No. 4, a mixture of 1 percent PDA in oil No. 1608 was applied to the forearm on September 3 and moderate reaction resulted in 24 to 48 hours (see table 1), which had cleared by September 7. On September 10, on the opposite arm, four additional applications of the PDA-oil mixtures were made and slight reaction occurred from one of these applications, which cleared in 24 hours (see table 2). However, on September 14 there was a marked redness of all areas of application, both those which had been applied on September 3 and the four which had been applied on September 10. By September 16 all areas of application showed marked erythema, swelling, and small vesicles. Marked itching and burning were noted. These marked reactions continued until October 1. On October 4 the swelling and erythema had disappeared and scaling took place. Healing was complete within 3 to 5 days thereafter. (See figs. 2, 3, and 4.)

On September 3, subject No. 9 received two applications of 1 percent PDA in oil No. 1608 on the left forearm. There resulted from these applications an erythema, soreness, and slight swelling. The response had entirely cleared by September 7. On September 13, four applications of the same oil mixture were applied to the opposite forearm. (See table 2.) No reaction of any kind occurred until September 28, when small vesicles appeared, accompanied by itching, erythema, and slight swelling. (See figure 5.) The itching and erythema persisted for more than a month after the first appearance of the reaction, clearing slowly after treatment with lanoline. Slight pigmentation of the areas persisted for some weeks.

It was noted that in both these delayed cases the area which had been washed with soap and water 30 minutes after applying the PDA-oil mixture showed a delayed reaction although no initial response was in evidence. (See table 2.)

DISCUSSION

An examination of the results obtained in the tests of the vesicant qualities of 1 percent PDA-oil mixtures on man shows that there is a marked difference in the susceptibility of certain persons to the action of PDA. A total of 16 men were subjected to the skin tests, using the

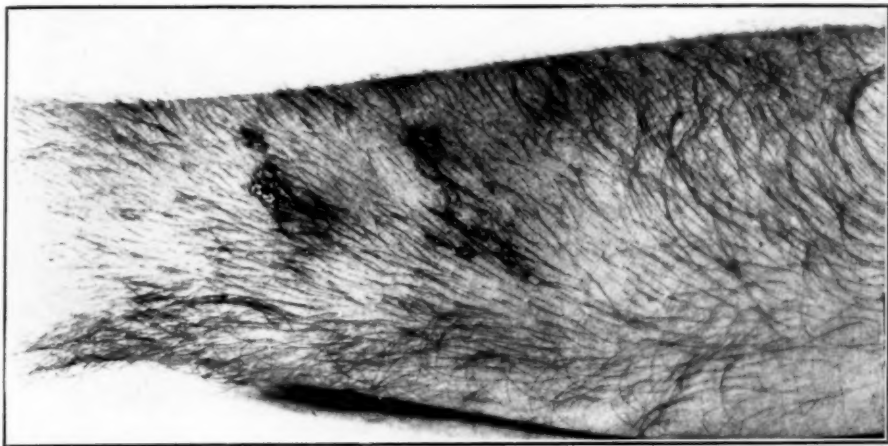


FIGURE 1.—(Subject No. 10; see table 2.) Areas 48 hours after application of 1 drop of 1 percent PDA-oil No. 1608 mixture.



FIGURE 2.—(Subject No. 4; see table 1 for initial reaction.) Areas 12 days after application of 1 percent PDA-oil No. 1608 mixture.



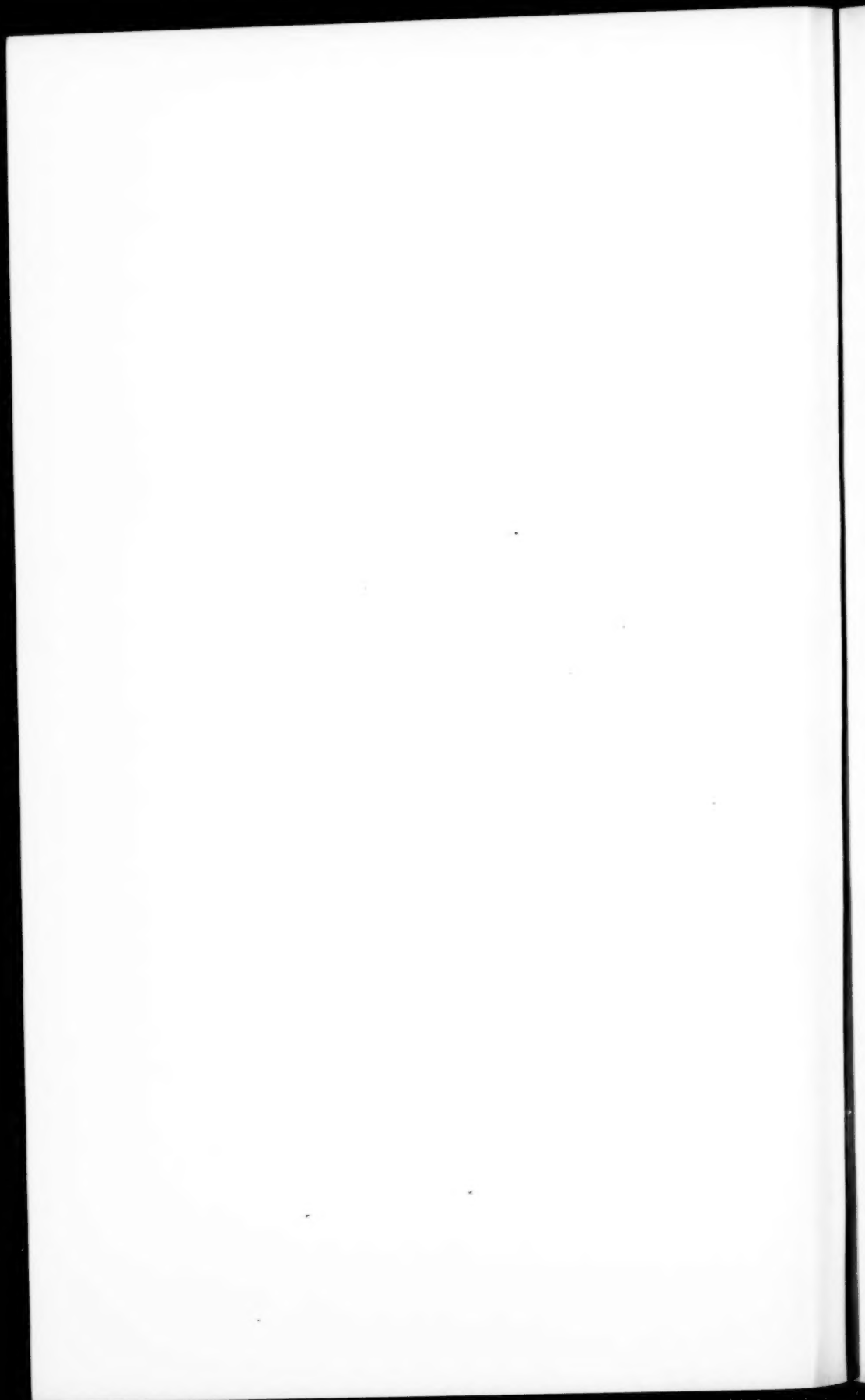
FIGURE 3.—(Subject No. 4; see table 2 for initial reaction.) Areas 5 days after application of 1 percent PDA-oil No. 1608 mixture.



FIGURE 4.—(Subject No. 4; see tables 1 and 2 for initial reaction. See figures 2 and 3 for appearance 12 days previously.) Areas 17 and 24 days after application of 1 percent PDA-oil No. 1608 mixture.



FIGURE 5.—(Subject No. 9, see table 2. No initial reaction.) Reaction to 1 percent PDA-oil No. 1608 mixture 17 days after application. Reaction persisted for 40 days.



1-percent PDA-oil mixtures. Of this number, three showed marked initial skin reactions, seven gave no subjective or objective symptoms of reaction, while six showed varying degrees of susceptibility from moderate to slight. It seems probable that preliminary skin tests would be helpful in determining those workers who would have a marked tendency toward skin reactions when working in the wood-treating plants. By selection of workers showing no such skin reaction many of the untoward effects of the PDA-oil mixtures could be prevented.

While the lighter oil (No. 208) mixture gives a much less severe skin reaction, as shown herein, if large quantities of this oil should come in contact with the workers' skin and not be removed within a short time, skin reactions would be expected similar to those obtained experimentally with the 1-percent PDA in oil No. 1608. The greater spreading power (lower viscosity) of the lighter oil reduces the severity of the skin reaction. Large quantities of the lighter oil mixture produced marked and widespread burns on rabbits.

In tests previously reported (4) it was shown that oil mixtures remaining on the surface of impregnated timbers are vesicant. Since the treatment by steam after the Rueping process not only effectively removes this excess surface oil but also causes the oil mixture contained in the wood to lose its vesicant properties, it seems evident that this type of treatment is most desirable.

In the use of the oil mixtures at commercial wood preserving plants, it is suggested that the wood products be treated in an entirely closed process, and a method of subsequent treatment, such as steaming under pressure, to remove the oil adhering to the surface, be incorporated in the operation. In this manner many of the hazards to the skin will be eliminated.

As a protective measure, the application of a ferric hydroxide-petrolatum jelly salve or paste may be useful. The mixture should be spread over all exposed parts of the worker.

As a first-aid measure for persons exposed to the hazards of undiluted PDA, as in mixing the PDA-oil mixtures, it is recommended that large quantities of a saturated water solution of sodium bicarbonate be kept in a convenient place, near the place of such exposure. If undiluted PDA comes in contact with the skin, immediate and copious lavage with the sodium bicarbonate solution will prevent serious burns. However, time is an important consideration in the case of contact with pure PDA and immediate removal of the material is of prime importance. The toxic effects of PDA when absorbed through the skin are shown in the previous paper, the toxic dose for rabbits by skin absorption being 8-10 mg per kilo of body weight (4).

In most cases, by removing the 1 percent PDA-oil mixtures with warm water and ordinary toilet soap within 30 minutes after they

gain contact with the skin, the vesicant effect will be materially reduced and probably ill effects will be prevented. If the oil mixture is removed after 1 hour, but slight lessening of the vesicant action will result. In all cases the oil should be removed with warm water and soap as quickly as possible.

It has been shown that 1 percent PDA-oil mixtures may cause marked delayed reaction on contact with human skin, even though the oil mixture is removed with soap and water within 30 minutes. The reaction has made its appearance as long as 15 days after contact with the mixture.

Excess oil remaining on the surface of the impregnated wood constitutes a hazard to those required to handle the treated timbers. A method of treatment should be devised so that no excess oil remains on the surface of the treated wood.

In the light of this investigation it seems probable that PDA-oil mixtures can be safely used only by the most efficiently operated wood-preserving establishments. The indiscriminate use of these mixtures, as substitutes for other preservatives, in the usual type of apparatus found in many small wood-impregnating plants will endanger the workers in the plants and all persons handling the oil-treated wood products thereafter. Therefore, it is recommended that mixtures of PDA in petroleum oils be handled with caution and workers be warned of the dangers arising from contact with the mixtures.

In the industrial application of PDA, the danger of acute poisoning by PDA vapors may be expected to be relatively slight, inasmuch as the intolerable concentration is 0.016 mg PDA per liter. Before any acutely toxic PDA vapor concentration could be established, extreme eye and nasal irritation would act as an ample warning, forcing unprotected workers to leave the workrooms.

The investigations of the toxic effects of PDA and of PDA-oil mixtures reported in this series of papers deal only with the acute effects of such exposures. In addition to the acute effects of the PDA, consideration must be given to the possibilities of hazards arising from the repeated absorption of smaller quantities of PDA and other arsenicals. However, from other experience, the possibilities of such chronic poisoning are remote.

SUMMARY

Mixtures of petroleum distillates containing about 1 percent by weight phenyldichlorarsine have been suggested as wood preservatives.

Oil mixtures containing phenyldichlorarsine have been applied to men. The reactions resulting from skin contact with these mixtures vary with the individual. Some persons show no reaction; in others a

marked initial vesiculation resulted. In two cases a delayed action occurred.

A method of protection by spreading a salve, prepared from petrolatum jelly and ferric hydroxide, over the exposed skin area of the worker is suggested.

Impregnated wood free from surface oil causes no reactions when applied to the skin of men for as long as 1 hour. Steaming after impregnation removes surface oil and renders the oil mixture in the body of the wood nonvesicant to rabbits.

Careful control of impregnating processes seems to be the only manner in which these mixtures may be used safely as wood preservatives. The hazards would seem to be controlled if the impregnation of the wood were carried out in an entirely closed process, and in such a manner that no excess oil remained on the surface of the impregnated timbers. Safe methods for the indiscriminate use of these mixtures as wood preservatives have not been found.

REFERENCES

- (1) Atwood, W. G., and Johnson, A. A.: Marine structures, their deterioration and preservation. National Research Council. 1924.
- (2) McQuaid, Howard S.: U. S. Patent No. 1758958. May 20, 1930. Wood preservative. (Assigned to Harold W. Walker.)
- (3) Walker, H. W., McQuaid, H. S., Allen, M. S., and Carter, R. H.: Chemical Warfare Service. Marine Piling Investigation. Bulletin Am. Ry. Eng. Assoc., 28: 17 (October 1926).
- (4) Dudley, H. C., and Jones, B. F.: Toxicology of phenyldichlorarsine. I. Experiments with animals. Pub. Health Rep., 53: 338 (Mar. 4, 1938).

DIPHTHERIA IMMUNIZATION MADE COMPULSORY IN FRANCE

In view of the public health interest that attaches to the action of the French legislature in making diphtheria immunization compulsory in France, one of the first countries, if not the first, to require the application of this preventive measure on a nation-wide scale, there is printed below the text of the recent compulsory diphtheria immunization law adopted by the Senate and Chamber of Deputies and promulgated by the President. This law makes compulsory the immunization, with "l'anatoxine," or toxoid, of all children during infancy, that is, in the second or third year of life, before the age of greatest susceptibility and highest mortality and at the period of minimum reaction. Following is the text of the law translated from the French text furnished by the American consul in Paris:

There is added to the law of February 15, 1902, regarding the protection of the public health, an addition to article 6 which reads as follows:

"Antidiphtheria vaccination with *l'anatoxine* [toxoid] is compulsory during the second or third year of life. The parents or guardians are personally responsible

for the carrying out of this measure, proof of which shall be furnished on admission to any school, nursery, vacation colony, or other assembly of children.

"During the first year of application of the present article, all children under 14 years of age attending the schools, if they have not yet been vaccinated against diphtheria, shall be subjected to such vaccination.

"A public administrative regulation, rendered according to the opinion of the Academy of Medicine and the Consultative Committee on Public Health of France, shall decide the measures necessitated by the application of the preceding provisions."

The present law, considered and adopted by the Senate and the Chamber of Deputies, shall be executed as law of the State.

Paris, June 25, 1938.

POLIOMYELITIS IN THE PERSONNEL OF THE LOS ANGELES COUNTY GENERAL HOSPITAL IN 1934

Coincidentally with an epidemic of poliomyelitis in the city and county of Los Angeles, Calif., in the summer of 1934, there occurred among the employees of the Los Angeles County General Hospital an epidemic of illness diagnosed at the time as poliomyelitis. The cases reported represented an attack rate of approximately 4.4 percent, with nurses and physicians suffering rates of 10.7 and 5.4 percent, respectively.

A recent bulletin¹ issued by the Public Health Service gives a clinical and epidemiological account of this institutional epidemic. The study is based on case records obtained from personal interviews of the patients.

It is the author's opinion from the facts presented in this bulletin that, despite the peculiar clinical character of the illness and its unusual spread within a metropolitan institution of adults, it is a justifiable assumption that the cases actually resulted from infection with the virus of poliomyelitis.

ACTS ESTABLISHING THE NATIONAL CANCER INSTITUTE AND EXPANDING VENEREAL DISEASE CONTROL ACTIVITIES

In view of the general interest that has been manifested by health workers and others in two recent acts of Congress, one establishing the National Cancer Institute, and the other authorizing appropriations for the purpose of assisting States, health districts, and local political subdivisions in venereal disease control work, there are printed here in full the texts of these acts.

¹ Epidemiological study of an epidemic, diagnosed as poliomyelitis, occurring among the personnel of the Los Angeles County General Hospital during the summer of 1934. By A. G. Gilliam, Passed Assistant Surgeon, U. S. Public Health Service. Public Health Bulletin No. 240. For sale by the Superintendent of Documents, Washington, D. C. Price 15 cents.

Under these authorizations Congress appropriated \$750,000 for the construction of the National Cancer Institute building and \$400,000 for carrying out the provisions of the act in each of the fiscal years 1938 and 1939. The plans for the building have been approved and it is expected that the contract will be let by the fall of the present year. For the cooperative work authorized under the venereal disease control act, \$3,000,000 has been appropriated for the fiscal year 1939 and regulations governing the allotment of funds to the States have been prepared.

[PUBLIC—NO. 244—75TH CONGRESS]

[CHAPTER 565—1ST SESSION]

[S. 2067]

AN ACT

To provide for, foster, and aid in coordinating research relating to cancer; to establish the National Cancer Institute; and for other purposes

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That for the purposes of conducting researches, investigations, experiments, and studies relating to the cause, diagnosis, and treatment of cancer; assisting and fostering similar research activities by other agencies, public and private; and promoting the coordination of all such researches and activities and the useful application of their results, with a view to the development and prompt widespread use of the most effective methods of prevention, diagnosis, and treatment of cancer, there is hereby established in the Public Health Service a division which shall be known as the National Cancer Institute (hereinafter referred to as the "Institute").

SEC. 2. The Surgeon General of the Public Health Service (hereinafter referred to as the "Surgeon General") is authorized and directed for the purposes of this Act and subject to its provisions, through the Institute and in cooperation with the National Cancer Advisory Council hereinafter established—

(a) To conduct, assist, and foster researches, investigations, experiments, and studies relating to the cause, prevention, and methods of diagnosis and treatment of cancer;

(b) To promote the coordination of researches conducted by the Institute and similar researches conducted by other agencies, organizations, and individuals;

(c) To procure, use, and lend radium as hereinafter provided;

(d) To provide training and instruction in technical matters relating to the diagnosis and treatment of cancer;

(e) To provide fellowships in the Institute from funds appropriated or donated for such purpose;

(f) To secure for the Institute consultation services and advice of cancer experts from the United States and abroad; and

(g) To cooperate with State health agencies in the prevention, control, and eradication of cancer.

SEC. 3. There is hereby created the National Advisory Cancer Council (herein referred to as the "Council"), to consist of six members to be appointed by the Surgeon General with the approval of the Secretary of the Treasury, and of the Surgeon General, ex officio, who shall be chairman of the Council. The six appointed members shall be selected from leading medical or scientific authorities who are outstanding in the study, diagnosis, or treatment of cancer in the United States. Each appointed member shall hold office for a term of three years, except

that (1) any member appointed to fill a vacancy occurring prior to the expiration of the term for which his predecessor was appointed shall be appointed for the remainder of such term, and (2) the terms of office of the members first taking office shall expire, as designated by the Surgeon General at the time of appointment, two at the end of the first year, two at the end of the second year, and two at the end of the third year after the date of the first meeting of the Council. No appointed member shall be eligible to serve continuously for more than three years but shall be eligible for reappointment if he has not served as a member of the Council at any time within twelve months immediately preceding his reappointment. Each appointed member shall receive compensation at the rate of \$25 per day during the time spent in attending meetings of the Council and for the time devoted to official business of the Council under this Act, and actual and necessary traveling and subsistence expenses while away from his place of residence upon official business under this Act.

SEC. 4. The Council is authorized—

(a) To review research projects or programs submitted to or initiated by it relating to the study of the cause, prevention, or methods of diagnosis and treatment of cancer, and certify approval to the Surgeon General for prosecution under section 2 (a) hereof any such projects which it believes show promise of making valuable contributions to human knowledge with respect to the cause, prevention, or methods of diagnosis and treatment of cancer;

(b) To collect information as to studies which are being carried on in the United States or any other country as to the cause, prevention, and methods of diagnosis and treatment of cancer, by correspondence or by personal investigation of such studies, and with the approval of the Surgeon General make available such information through the appropriate publications for the benefit of health agencies and organizations (public or private), physicians, or any other scientists, and for the information of the general public;

(c) To review applications from any university, hospital, laboratory, or other institution, whether public or private, or from individuals, for grants-in-aid for research projects relating to cancer, and certify to the Surgeon General its approval of grants-in-aid in the cases of such projects which show promise of making valuable contributions to human knowledge with respect to the cause, prevention, or methods of diagnosis or treatment of cancer;

(d) To recommend to the Secretary of the Treasury for acceptance conditional gifts pursuant to section 6; and

(e) To make recommendations to the Surgeon General with respect to carrying out the provisions of this Act.

SEC. 5. In carrying out the provisions of section 2 the Surgeon General is authorized—

(a) With the approval of the Secretary of the Treasury, to purchase radium, from time to time, without regard to section 3709 of the Revised Statutes; to make such radium available for use in carrying out the purposes of this Act; and, for such consideration and subject to such conditions as the Secretary of the Treasury shall prescribe, to lend such radium to institutions, now existing or hereafter established in the United States for the study of the cause, prevention, or methods of diagnosis or treatment of cancer, or for the treatment of cancer;

(b) To provide the necessary facilities where training and instruction may be given in all technical matters relating to diagnosis and treatment of cancer to such persons as in the opinion of the Surgeon General have proper technical training and shall be designated by him for such training or instruction; such persons while receiving training or instruction may, with the approval of the Surgeon General, receive a per-diem allowance to be fixed by the Surgeon General but not to exceed \$10;

(c) To establish and maintain, with the approval of the Secretary of the Treasury, research fellowships in the Institute with such stipends or allowances (including traveling and subsistence expenses) as the Surgeon General may deem necessary to procure the assistance of the most brilliant and promising research fellows from the United States or abroad;

(d) To secure for the Institute, from time to time and for such periods as may be advisable, the assistance and advice of experts, scholars, and consultants from the United States or abroad who are learned and experienced in the problems involved in accomplishing the purposes of this Act;

(e) To make grants-in-aid for research projects certified by the Council pursuant to section 4 (c); and

(f) To adopt, upon recommendation of the Council and with the approval of the Secretary of the Treasury, such additional means as the Surgeon General may deem necessary or appropriate to carry out the provisions of sections 1 and 2 of this Act.

SEC. 6. The Secretary of the Treasury is authorized to accept on behalf of the United States gifts made unconditionally by will or otherwise for study, investigation, or research into the cause, prevention, and methods of diagnosis and treatment of cancer, or for the acquisition of grounds or for the erection, equipment, and maintenance of premises, buildings, and equipment for the Institute. Conditional gifts may be accepted by the Secretary if recommended by the Surgeon General and the Council. Any such gifts, if in money, shall be held in trusts and shall be invested by the Secretary of the Treasury in securities of the United States, and the principal or income thereof shall be expended by the Surgeon General, with the approval of the Secretary of the Treasury, for the purposes prescribed by this Act, subject to the same examination and audit as provided for appropriations made for the Public Health Service by Congress. Donations of \$500,000 or over in aid of research under this Act shall be acknowledged permanently by the establishment within the Institute of suitable memorials to the donors.

SEC. 7. (a) There is hereby authorized to be appropriated a sum not to exceed \$750,000 for the erection and equipment of a suitable and adequate building and facilities for the use of the Institute in carrying out the provisions of this Act. The Secretary of the Treasury is authorized to acquire, by purchase, condemnation, donation, or otherwise, a suitable and adequate site or sites in or near the District of Columbia for such building and facilities, and to erect thereon, furnish, and equip such buildings and facilities when funds are made available.

(b) There is hereby authorized to be appropriated the sum of \$700,000 for each fiscal year, beginning with the fiscal year ending June 30, 1938, for the purpose of carrying out the provisions of this Act (except subsection (a) hereof). Sums appropriated pursuant to this subsection may be expended in the District of Columbia for personal services, stenographic recording and translating services, by contract if deemed necessary, without regard to section 3709 of the Revised Statutes; traveling expenses (including the expenses of attendance at meetings when specifically authorized by the Surgeon General); rental, supplies and equipment, purchase and exchange of medical books, books of reference, directories, periodicals, newspapers, and press clippings; purchase, operation, and maintenance of motor-propelled passenger-carrying vehicles; printing and binding (in addition to that otherwise provided by law); and for all other necessary expenses in carrying out the provisions of this Act.

SEC. 8. (a) There is hereby authorized to be appointed in the Public Health Service, in accordance with applicable law, such commissioned officers as may be necessary to aid in carrying out the provisions of this Act.

(b) This Act shall not be construed as superseding or limiting (1) the functions, under any other Act, of the Public Health Service or any other agency of the United States relating to the study of the prevention, diagnosis, and treatment of cancer; or (2) the expenditure of money therefor.

(c) The Surgeon General with the approval of the Secretary of the Treasury is authorized to make such rules and regulations as may be necessary to carry out the provisions of this Act.

(d) The Surgeon General shall include in his annual report for transmission to Congress a full report of the administration of this Act, including a detailed statement of receipts and disbursements.

(e) This Act shall take effect thirty days after the date of its enactment.

(f) This Act may be cited as the "National Cancer Institute Act."

Approved, August 5, 1937.

[PUBLIC—No. 540—75TH CONGRESS]

[CHAPTER 267—3D SESSION]

[S. 3290]

AN ACT

To impose additional duties upon the United States Public Health Service in connection with the investigation and control of the venereal diseases

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Act approved July 9, 1918, is hereby amended by adding, after section 4 of chapter XV (40 Stat. 886; U. S. C., title 42, sec. 25), sections 4a, 4b, 4c, 4d, and 4e to read as follows:

"Sec. 4a. For the purpose of assisting States, counties, health districts, and other political subdivisions of the States in establishing and maintaining adequate measures for the prevention, treatment, and control of the venereal diseases; for the purpose of making studies, investigations, and demonstrations to develop more effective measures of prevention, treatment, and control of the venereal diseases, including the training of personnel; for the pay, allowances, and traveling expenses of commissioned officers and other personnel assigned to duties in carrying out the purposes of sections 4a to 4e, inclusive, of this Act in the District of Columbia and elsewhere; and for the printing of reports, documents, and other material relating thereto, there is hereby authorized to be appropriated for the fiscal year ending June 30, 1939, not exceeding the sum of \$3,000,000; for the fiscal year ending June 30, 1940, not exceeding the sum of \$5,000,000; for the fiscal year ending June 30, 1941, not exceeding the sum of \$7,000,000; and for each fiscal year thereafter, such sum as may be deemed necessary to carry out the purposes of sections 4a to 4e, inclusive, of this Act.

"Sec. 4b. Prior to the beginning of each fiscal year the Surgeon General of the Public Health Service shall determine, out of the appropriations made pursuant to section 4a, the sum to be allotted to the several States, including the District of Columbia, Alaska, Puerto Rico, Virgin Islands, and Hawaii. The Surgeon General shall then allot such sum to the several States upon the basis of (1) the population, (2) the extent of the venereal-disease problem, and (3) the financial needs of the respective States. Upon making such allotments he shall certify the amounts thereof to the Secretary of the Treasury. The amount of an allotment to any State for any fiscal year remaining unpaid at the end of such fiscal year shall be available for allotment to the States for the succeeding fiscal year in addition to the amount appropriated and available for such fiscal year.

"Sec. 4c. Prior to the beginning of each quarter of the fiscal year the Surgeon General of the Public Health Service shall determine the amount to be paid to each State for such quarter from the allotment to such State, and shall certify the

amount so determined to the Secretary of the Treasury. Upon receipt of such certification, the Secretary of the Treasury shall, through the Division of Disbursement of the Treasury Department and prior to audit or settlement by the General Accounting Office, pay in accordance with such certification. The moneys so paid to any State shall be expended in carrying out the purposes specified in section 4a, and in accordance with plans presented by the health authority of such State and approved by the Surgeon General of the Public Health Service.

"SEC. 4d. With the approval of the Secretary of the Treasury and after consultation with a conference of State and Territorial health officers, the Surgeon General of the Public Health Service is authorized to prescribe the rules and regulations necessary to carry out the purposes of sections 4a to 4e, inclusive, of this Act.

"SEC. 4e. Sections 4a to 4e, inclusive, of this Act shall not be construed as superseding or limiting the functions, under any other Act, of the Public Health Service relating to the prevention, treatment, and control of venereal diseases, or the expenditure of money therefor."

Approved, May 24, 1938.

PUBLIC HEALTH SERVICE PUBLICATIONS

A List of Publications Issued During the Period January-June, 1938

There is printed herewith a list of publications of the United States Public Health Service issued during the period January-June 1938.

The most important articles that appear each week in the PUBLIC HEALTH REPORTS are reprinted in pamphlet form, making possible a wider and more economical distribution of information that is of especial value and interest to public health workers and the general public.

All of the publications listed below except those marked with an asterisk (*) are available for free distribution and as long as the supply lasts may be obtained by addressing the Surgeon General, United States Public Health Service, Washington, D. C. Those publications marked with an asterisk are not available for free distribution, but, unless stated to be "out of print," may be purchased from the Superintendent of Documents, Government Printing Office, Washington, D. C., *at the prices noted*. (No remittances should be sent to the Public Health Service.)

Periodicals

*Public Health Reports (weekly), January-June, vol. 53, nos. 1 to 25, pages 1 to 1064. 5 cents a number.

*Venereal Disease Information (monthly), January-June, vol. 19, nos. 1 to 6, pages 1 to 207. 5 cents a number.

Reprints From the Public Health Reports

1895. Studies on chronic brucellosis. III. Methods used in obtaining cultures. By Mary A. Poston. January 7, 1938. 4 pages.

1896. Age of gainful white and Negro female workers of the United States, 1920 and 1930. Studies on the age of gainful workers no. 5. January 7, 1938. 13 pages.

1897. A study of the variations in reports on hospital facilities and their use. By Joseph W. Mountin, Elliott H. Pennell, and Emily Hankla. January 7, 1938. 9 pages.
1898. Studies in chemotherapy. VII. Some new sulphur compounds active against bacterial infections. By Hugo Bauer and Sanford M. Rosenthal. January 14, 1938. 10 pages.
1899. The blacktongue-preventive value of whole whey, delactosed whey, and American cheese. By W. H. Sebrell, R. H. Onstott, and D. J. Hunt. January 21, 1938. 12 pages.
1900. Riboflavin deficiency in dogs. By W. H. Sebrell and R. H. Onstott. January 21, 1938. 12 pages.
1901. Toxicology of selenium. V. Toxic and vesicant properties of selenium oxychloride. By H. C. Dudley. January 21, 1938. 4 pages.
1902. Pathologic histology in mice produced by intravenous inoculation with the toxin of *Clostridium sordellii* (bifermentans). By R. D. Lillie. January 28, 1938. 9 pages.
1903. The pollution problem in the Ohio River drainage basin. By H. R. Crohurst. January 28, 1938. 7 pages.
1904. Report on market-milk supplies of certain urban communities. Compliance of the market-milk supplies of certain urban communities with the Grade A pasteurized and Grade A raw milk requirements of the Public Health Service milk ordinance and code (as shown by compliance (not safety) ratings of 90 percent or more reported by the State milk-sanitation authorities during the period January 1, 1936, to December 31, 1937). January 28, 1938. 5 pages.
1905. The accuracy of certified causes of death. Recommendations of the Committee on the Accuracy of Certified Causes of Death of the American Public Health Association for the Revision of the International List of Causes of Death in 1938. February 4, 1938. 34 pages.
1906. Harmful industrial dusts. By R. R. Sayers. February 11, 1938. 12 pages.
1907. The production of tumors in mice of strains C₃H and Y by dibenzanthracene and methyleholanthrene. By H. B. Andervont. Pulmonary tumors in mice. V. Further studies on the influence of heredity upon spontaneous and induced lung tumors. By H. B. Andervont. February 11, 1938. 9 pages.
1908. The role of airplane dusting in the control of *Anopheles* breeding associated with impounded waters. By R. B. Watson, C. C. Kiker, and H. A. Johnson. February 18, 1938. 13 pages; 4 plates.
1909. Reliability of medical judgments on malnutrition. By Mayhew Derryberry. February 18, 1938. 6 pages.
1910. Selenium as a potential industrial hazard. By H. C. Dudley. February 25, 1938. 12 pages.
1911. Acute response of guinea pigs to inhalation of methyl isobutyl ketone. By H. Specht. February 25, 1938. 9 pages; 1 plate.
1912. Studies of the bactericidal treatment of milk cans in hot-air cabinets. March 4, 1938. 10 pages; 2 plates.
1913. Toxicology of phenyldichlorarsine. I. Experiments with animals. By H. C. Dudley and B. F. Jones. March 4, 1938. 10 pages; 1 plate.
1914. A modified cell for dust counting. By Charles E. Couchman and Wilmer H. Schulze. March 4, 1938. 4 pages; 1 plate.
1915. Prevalence of trichinosis in the United States. By Willi Sawitz. March 11, 1938. 19 pages.

1916. A study of *Trichinella spiralis* in the Hawaiian Islands. By Joseph E. Alicata. March 11, 1938. 10 pages.
1917. History and frequency of clinical scarlet fever cases and of injections for artificial immunization among 9,000 families, based on Nation-wide periodic canvasses, 1928-31. By Selwyn D. Collins. March 18, 1938. 19 pages.
1918. The validity of health service data gathered by the family survey method. By Elliott H. Pennell and Hazel O'Hara. March 25, 1938. 8 pages.
1919. A study of dental care in Detroit, Mich. By Rollo H. Britten. March 25, 1938. 14 pages.
1920. Differences in opportunities for health. By Joseph W. Mountin and Hazel O'Hara. April 1, 1938. 12 pages.
1921. Contamination of pasteurized milk by improper relative pressures in regenerators. By A. W. Fuchs. April 1, 1938. 10 pages.
1922. Disabling sickness among male industrial employees during the final quarter of 1937 and the entire year. By William M. Gafafer and Elizabeth S. Frasier. April 8, 1938. 5 pages.
1923. Variations in the form and services of public health organizations. By Joseph W. Mountin, Anthony J. Borowski, and Hazel O'Hara. April 8, 1938. 14 pages.
1924. Frequency of sickness and nonindustrial accidents causing disability lasting 8 calendar days or longer among 60,000 white male railroad employees, 1930-34, inclusive. By William M. Gafafer. April 15, 1938. 19 pages.
1925. Occurrence of tularaemia in the rabbit tick (*Haemaphysalis leporis palustris*) in Alaska. By Cornelius B. Philip and R. R. Parker. April 15, 1938. 2 pages.
1926. Frequency of surgical procedures among 9,000 families, based on Nation-wide periodic canvasses, 1928-31. By Selwyn D. Collins. April 22, 1938. 42 pages.
1927. Public Health Service publications. A list of publications issued during the period July-December 1937. April 22, 1938. 5 pages.
1928. Serums, antitoxin, and drugs in the treatment of meningococcus meningitis. By Sara E. Branham. April 29, 1938. 7 pages.
1929. Studies on trichinosis. V. The incidence of trichinosis as indicated by post-mortem examinations of 1,000 diaphragms. By M. O. Nolan and John Bozicevich. April 29, 1938. 22 pages.
1930. Trends in shellfish sanitation. By H. N. Old. May 6, 1938. 9 pages.
1931. Planning the organization and conduct of stream pollution surveys. By J. K. Hoskins. May 6, 1938. 7 pages.
1932. Studies on dental caries. I. Dental status and dental needs of elementary school children. By Henry Klein, Carroll E. Palmer, and John W. Knutson. May 13, 1938. 14 pages.
1933. Experimental vanadium poisoning in the white rat. By Esther Peterson Daniel and R. D. Lillie. May 13, 1938. 13 pages; 2 plates.
1934. The influence of nonbreeding and foster nursing upon the occurrence of spontaneous breast tumors in strain C₃H mice. By H. B. Andervont and W. J. McEleney. May 13, 1938. 6 pages.
1935. Prophylactic value of a single dose of precipitated pertussis vaccine. Preliminary report. By W. T. Harrison, Jos. P. Franklin, and Joseph A. Bell. May 20, 1938. 4 pages.
1936. The incubation period in undulant fever. By A. V. Hardy, S. Frant, and M. M. Kroll. May 20, 1938. 7 pages.
1937. Trend of mortality and morbidity during 1937 and recent preceding years. Based on provisional data for all years. May 6, 1938. 19 pages.

1938. Studies on blood coagulation. I. General considerations. By Laszlo Detre. May 27, 1938. 22 pages.
1939. Age of delinquents in relationship to Rorschach Test scores. By M. J. Pescor. May 27, 1938. 13 pages.
1940. Lighting for low cost housing. By James E. Ives. June 3, 1938. 7 pages.
1941. The sanitation of isolated dwellings. By H. A. Whittaker. June 3, 1938. 8 pages.
1942. A further study of the purification and tannic acid precipitation of scarlet fever toxin. By M. V. Veldee. June 3, 1938. 5 pages.
1943. Number and length of nursing visits as indices of nursing service. By Helen Bean. June 3, 1938. 8 pages.
1944. The effect of moisture and age on stability of neoparsphenamine. By T. F. Probey and W. T. Harrison. June 10, 1938. 7 pages.
1945. The effect of the age of neoparsphenamine on reaction expectancy. By C. S. Stephenson, T. F. Probey, and W. T. Harrison. June 10, 1938. 4 pages.
1946. Flea infestation of domestic rats in San Francisco, Calif. By C. R. Eskey. June 10, 1938. 3 pages.
1947. The prevention and control of cancer: A plan for Nation-wide organization. By J. W. Schereschewsky. June 17, 1938. 9 pages.
1948. Effects of intramuscular injections of vitamin B₁ on acute leprous neuritis and of oral administration on the general disease. A preliminary report. By L. F. Badger and D. W. Patrick. June 17, 1938. 9 pages.
1949. Studies on oxyuriasis. XVI. The number of eggs produced by the pinworm, *Enterobius vermicularis*, and its bearing on infection. By Lucy Reardon. June 17, 1938. 6 pages.
1950. Rocky Mountain spotted fever. Geographical and seasonal prevalence, case fatality, and preventive measures. By Brock C. Hampton and Harry G. Eubank. June 17, 1938. 7 pages.
1951. Studies on the epidemiology of poliomyelitis. By C. C. Dauer. June 24, 1938. 18 pages.
1952. Studies on dental caries. IV. Tooth mortality in elementary school children. By John W. Knutson and Henry Klein. June 24, 1938. 12 pages.

Supplements to the Public Health Reports

134. The notifiable diseases. Prevalence in States, 1936. 1938. 13 pages.
135. Common colds. By Robert Olesen. 1938. 8 pages.
136. Climate and tuberculosis. By F. C. Smith. 1938. 6 pages.
137. Personal hygiene. Compiled by Robert Olesen. 1938. 46 pages.
142. Pneumonia. Mortality and measures for prevention. Report of Advisory Committee on Prevention of Pneumonia Mortality. 1938. 32 pages.

Public Health Bulletins

240. Epidemiological study of an epidemic, diagnosed as poliomyelitis, occurring among the personnel of the Los Angeles County General Hospital during the summer of 1934. By A. G. Gilliam. April 1938. 90 pages.
242. Care during the recovery period in paralytic poliomyelitis. By Henry O. Kendall and Florence P. Kendall. With an introduction by George E. Bennett and Robert W. Johnson, Jr. April 1938. 92 pages; 14 half tones.

Unnumbered Publications

- *Index to Public Health Reports, vol. 52, part 2 (July-December 1937). 1938. 25 pages. 5 cents.

- *National Negro Health Week program. This pamphlet is published annually, usually about the middle of March, for community leaders in an effort to suggest ways and means by which interested individuals and organizations may be organized for a concerted and effective attack upon the community's disease problems. Twenty-fourth annual observance. 1938. 8 page folder. Out of print.
- *National Negro Health Week poster. Twenty-fourth annual observance. 1938. Out of print.
- *National Negro Health Week leaflet. Twenty-fourth annual observance. 1938. 2 pages. Out of print. »

Annual Report

Annual Report of the Surgeon General of the United States Public Health Service for the fiscal year 1937. 164 pages.

Reprints From Venereal Disease Information

78. Sulfanilamide therapy in gonococcal infections. By C. J. Van Slyke, J. Durward Thayer and J. F. Mahoney. Vol. 18, December 1937. 8 pages.
- *79. Progress in venereal disease control in the United States, July 1, 1937. Vol. 18, December 1937. 4 pages. 5 cents.

Supplements to Venereal Disease Information

5. The diagnosis of syphilis by the general practitioner. By Joseph Earle Moore. 36 pages.
6. Management of syphilis in general practice. By Joseph Earle Moore in collaboration with Harold N. Cole, Paul A. O'Leary, Thomas Parran, John H. Stokes, and R. A. Vonderlehr. 61 pages.

Venereal Disease Folder

1. Syphilis: Its cause, its spread, its cure. 8 pages.

DEATHS DURING WEEK ENDED JULY 9, 1938

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended July 9, 1938	Correspond- ing week, 1937
Data from 88 large cities of the United States:		
Total deaths.....	7,416	¹ 7,668
Average for 3 prior years.....	7,448	-----
Total deaths, first 27 weeks of year.....	229,362	250,830
Deaths under 1 year of age.....	545	¹ 556
Average for 3 prior years.....	500	-----
Deaths under 1 year of age, first 27 weeks of year.....	14,365	15,705
Data from industrial insurance companies:		
Policies in force.....	69,193,356	70,043,901
Number of death claims.....	8,915	9,313
Death claims per 1,000 policies in force, annual rate.....	0.7	0.9
Death claims per 1,000 policies, first 27 weeks of year, annual rate.....	9.6	10.5

¹ Data for 86 cities.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers.

In these and the following tables, a zero (0) indicates a positive report and has the same significance as any other figure, while leaders (.....) represent no report, with the implication that cases or deaths may have occurred but were not reported to the State health officer.

Cases of certain diseases reported by telegraph by State health officers for the week ended July 16, 1938, rates per 100,000 population (annual basis), and comparison with corresponding week of 1937 and 5-year median

Division and State	Diphtheria				Influenza				Measles			
	July 16, 1938, rate	July 16, 1938, cases	July 17, 1937, cases	1933-1937 median	July 16, 1938, rate	July 16, 1938, cases	July 17, 1937, cases	1933-1937 median	July 16, 1938, rate	July 16, 1938, cases	July 17, 1937, cases	1933-1937 median
NEW ENGLAND												
Maine.....	12	2	1	1	.....	.....	.....	.....	238	39	27	80
New Hampshire.....	0	0	1	0	.....	.....	.....	.....	.....	.....	6	6
Vermont.....	0	0	1	0	.....	.....	.....	.....	653	48	6	27
Massachusetts.....	5	4	3	9	.....	.....	.....	.....	185	157	217	234
Rhode Island.....	0	0	0	2	.....	.....	.....	.....	15	2	6	16
Connecticut.....	9	3	11	6	6	2	1	1	114	38	51	53
MIDDLE ATLANTIC												
New York.....	10	26	25	30	12	13	15	13	439	1,092	615	615
New Jersey.....	10	8	4	9	5	4	.....	1	118	98	247	247
Pennsylvania.....	8	15	17	17	.....	.....	.....	.....	281	549	480	480
EAST NORTH CENTRAL												
Ohio.....	17	22	10	13	.....	.....	4	7	180	233	749	604
Indiana.....	20	13	6	7	29	19	3	8	15	10	78	27
Illinois ¹	15	22	21	26	4	6	7	9	60	91	299	299
Michigan ²	15	14	24	15	.....	.....	.....	.....	520	482	137	106
Wisconsin.....	5	3	7	4	37	21	4	4	1,174	659	45	91
WEST NORTH CENTRAL												
Minnesota.....	22	11	0	4	6	3	.....	.....	240	122	11	27
Iowa ³	4	2	2	4	.....	.....	.....	.....	116	57	15	15
Missouri.....	12	9	14	14	.....	.....	32	27	20	15	83	47
North Dakota.....	7	1	1	0	118	16	.....	.....	310	42	.....	8
South Dakota.....	15	2	0	1	.....	.....	.....	.....	.....	.....	2	4
Nebraska.....	4	1	1	5	.....	.....	.....	.....	84	22	8	24
Kansas.....	8	3	2	6	6	2	2	2	59	21	6	10

See footnotes at end of table.

Cases of certain diseases reported by telegraph by State health officers for the week ended July 16, 1938, rates per 100,000 population (annual basis), and comparison with corresponding week of 1937 and 5-year median—Continued

Division and State	Diphtheria				Influenza				Measles			
	July 16, 1938, rate	July 16, 1938, cases	July 17, 1937, cases	1933-1937 median	July 16, 1938, rate	July 16, 1938, cases	July 17, 1937, cases	1933-1937 median	July 16, 1938, rate	July 16, 1938, cases	July 17, 1937, cases	1933-1937 median
SOUTH ATLANTIC.												
Delaware.....	20	1	0	0					60	3	2	4
Maryland ²	6	2	4	4	6	2	2	1	65	21	31	31
District of Columbia ²	50	6	8	6					83	10	33	22
Virginia ²	21	11	6	7					125	65	55	60
West Virginia.....	8	3	11	9	20	7	7	4	115	41	45	28
North Carolina ²	15	10	9	10	3	2			449	301	86	86
South Carolina.....	8	3	0	1	192	65	40	40	92	33	8	8
Georgia ⁴	27	16	2	5								
Florida ⁴	19	6	4	2					41	13	8	8
EAST SOUTH CENTRAL												
Kentucky.....	4	2	7	6	5	3	2	2	27	15	109	40
Tennessee.....	9	5	9	3	27	15	4	5	34	19	57	19
Alabama ⁴	16	9	4	10	13	7	9	7	41	23	10	10
Mississippi ²	8	3	11	8								
WEST SOUTH CENTRAL												
Arkansas.....	13	5	6	1	13	5	4	3	76	30	6	4
Louisiana.....	29	12	4	7	27	11	22	10	15	6	3	15
Oklahoma.....	8	4	5	3	86	42	7	7	43	21	14	8
Texas ⁴	17	20	32	32	77	91	37	41	40	47	151	127
MOUNTAIN												
Montana ²	10	1	1	1					368	38	8	8
Idaho ²	42	4	0	0	11	1	1		53	5	8	3
Wyoming ¹	0	0	0	0					22	1	1	2
Colorado ²	44	9	3	3					146	30	38	20
New Mexico.....	0	0	0	2					99	8	19	8
Arizona.....	25	2	7	1	228	18	9		215	17	5	7
Utah ²	50	5	0	0	10	1			1,075	107	32	22
PACIFIC												
Washington.....	0	0	5	1					66	21	42	56
Oregon ²	5	1	0	1	107	21	4	4	91	18	5	17
California.....	14	16	18	25	14	16	8	25	330	397	48	323
Total.....	13	317	307	365	19	387	214	232	208	5,067	3,912	3,912
28 weeks.....	18	12,796	12,244	16,243	80	44,403	273,324	140,743	1,100	751,050	233,030	331,743

Division and State	Meningitis, meningococcus				Poliomyelitis				Scarlet fever			
	July 16, 1938, rate	July 16, 1938, cases	July 17, 1937, cases	1933-37 median	July 16, 1938, rate	July 16, 1938, cases	July 17, 1937, cases	1933-37 median	July 16, 1938, rate	July 16, 1938, cases	July 17, 1937, cases	1933-37 median
NEW ENGLAND												
Maine.....	0	0	1	0	0	0	0	1	61	10	2	2
New Hampshire.....	0	0	0	0	0	0	1	0	10	1	4	4
Vermont.....	0	0	0	0	14	1	1	0	54	4		6
Massachusetts.....	1.2	1	2	2	1.2	1	2	3	115	98	58	66
Rhode Island.....	0	0	0	0	8	1	0	1	46	6	9	6
Connecticut.....	0	0	0	1	0	0	0	0	57	19	10	10
MIDDLE ATLANTIC												
New York.....	0.8	2	13	10	0.8	2	10	10	56	149	153	167
New Jersey.....	0	0	1	2	2	2	1	3	29	17	26	67
Pennsylvania.....	1	2	7	3	0	0	1	1	96	188	199	130

See footnotes at end of table.

Cases of certain diseases reported by telegraph by State health officers for the week ended July 16, 1938, rates per 100,000 population (annual basis), and comparison with corresponding week of 1937 and 5-year median—Continued

Division and State	Meningitis, meningococcus				Polio-myelitis				Scarlet fever			
	July 16, 1938, rate	July 16, 1938, cases	July 17, 1937, cases	1933-37 median	July 16, 1938, rate	July 16, 1938, cases	July 17, 1937, cases	1933-37 median	July 16, 1938, rate	July 16, 1938, cases	July 17, 1937, cases	1933-37 median
EAST NORTH CENTRAL												
Ohio.....	0.7	1	5	4	0.7	1	14	2	60	78	120	129
Indiana.....	0	0	1	1	1.5	1	8	0	35	23	18	28
Illinois ¹	1.3	2	4	5	1.3	2	8	5	58	87	83	139
Michigan ¹	1.1	1	1	1	3	3	2	1	157	145	199	129
Wisconsin.....	0	0	0	2	0	0	0	0	98	55	66	66
WEST NORTH CENTRAL												
Minnesota.....	0	0	1	0	2	1	1	1	67	34	31	31
Iowa ¹	0	0	0	0	0	0	1	1	47	23	19	19
Missouri.....	1.3	1	4	2	1.3	1	4	1	24	18	53	19
North Dakota.....	15	2	1	0	0	0	0	0	89	12	14	3
South Dakota.....	0	0	0	0	15	2	0	0	45	6	7	2
Nebraska.....	4	1	0	0	0	0	4	0	15	4	7	7
Kansas.....	0	0	1	1	0	0	4	2	45	16	35	27
SOUTH ATLANTIC												
Delaware.....	0	0	0	0	0	0	0	0	40	2	1	1
Maryland ¹	3	1	5	3	0	0	0	0	28	9	15	18
District of Columbia ¹	0	0	0	0	8	1	0	0	25	3	4	4
Virginia ¹	8	4	5	4	8	4	3	2	15	8	7	14
West Virginia.....	3	1	1	1	0	0	2	2	34	12	23	17
North Carolina ¹	4	3	4	2	1.5	1	8	3	34	23	17	17
South Carolina.....	3	1	1	0	3	1	1	1	3	1	2	2
Georgia ¹	2	1	1	0	1.7	1	4	1	14	8	10	5
Florida ¹	3	1	0	0	3	1	0	0	6	2	3	1
EAST SOUTH CENTRAL												
Kentucky.....	4	2	1	1	1.8	1	5	1	16	9	11	13
Tennessee.....	1.8	1	2	2	4	2	7	7	7	4	4	5
Alabama ¹	7	4	0	0	5	3	1	1	16	9	5	6
Mississippi ¹	3	1	4	1	8	3	20	1	15	6	3	3
WEST SOUTH CENTRAL												
Arkansas.....	0	0	3	1	0	0	36	0	15	6	8	2
Louisiana.....	7	3	2	1	2	1	7	1	7	3	9	6
Oklahoma.....	0	0	1	0	2	1	46	0	25	12	7	6
Texas ¹	0	0	3	2	0.8	1	52	1	30	35	30	28
MOUNTAIN												
Montana ¹	0	0	0	0	0	0	0	0	97	10	4	2
Idaho ¹	11	1	0	0	0	0	0	0	63	6	10	2
Wyoming ¹	0	0	0	0	0	0	1	0	0	0	0	2
Colorado ¹	0	0	0	0	0	0	1	0	117	24	5	16
New Mexico.....	0	0	0	0	12	1	0	0	62	5	3	5
Arizona.....	0	0	0	0	13	1	0	0	25	2	2	5
Utah ¹	0	0	0	0	0	0	0	0	90	9	6	6
PACIFIC												
Washington.....	0	0	0	0	0	0	0	0	47	15	13	14
Oregon ¹	0	0	0	0	0	0	0	0	51	10	11	19
California.....	0	0	4	3	3	4	19	19	69	81	64	80
Total.....	1.5	37	79	79	1.8	45	275	191	52	1,298	1,391	1,391
28 weeks.....	2.8	1,963	3,871	3,795	0.9	625	1,346	1,346	192	132,945	160,214	160,214

Cases of certain diseases reported by telegraph by State health officers for the week ended July 16, 1938, rates per 100,000 population (annual basis), and comparison with corresponding week of 1937 and 5-year median—Continued

Division and State	Smallpox				Typhoid and paratyphoid fever				Whooping cough	
	July 16, 1938, rate	July 16, 1938, cases	July 17, 1937, cases	1933-1937 median	July 16, 1938, rate	July 16, 1938, cases	July 17, 1937, cases	1933-1937 median	July 16, 1938, rate	July 16, 1938, cases
NEW ENGLAND										
Maine.....	0	0	0	0	6	1	0	1	97	16
New Hampshire.....	0	0	0	0	0	0	0	0	-----	-----
Vermont.....	0	0	0	0	0	0	0	1	490	36
Massachusetts.....	0	0	0	0	0	0	3	3	111	94
Rhode Island.....	0	0	0	0	0	0	6	0	107	14
Connecticut.....	0	0	0	0	12	4	0	1	192	64
MIDDLE ATLANTIC										
New York.....	0	0	0	0	6	14	14	14	243	603
New Jersey.....	0	0	0	0	1.2	1	8	8	382	318
Pennsylvania.....	0	0	0	0	8	15	14	16	171	334
EAST NORTH CENTRAL										
Ohio.....	0	0	1	0	6	8	17	14	234	302
Indiana.....	38	25	4	1	24	16	10	9	23	15
Illinois ²	9	13	11	11	11	17	23	23	275	415
Michigan ²	4	4	0	0	0	0	3	9	484	448
Wisconsin.....	0	0	5	16	5	3	1	2	437	245
WEST NORTH CENTRAL										
Minnesota.....	14	7	7	4	2	1	0	0	130	66
Iowa ²	12	6	13	5	4	2	1	1	55	27
Missouri.....	10	8	5	2	9	7	37	21	82	40
North Dakota.....	30	4	8	0	7	1	0	0	377	51
South Dakota.....	0	0	0	1	0	0	0	0	75	10
Nebraska.....	11	3	0	3	4	1	1	1	76	20
Kansas.....	3	1	3	3	20	17	6	6	333	119
SOUTH ATLANTIC										
Delaware.....	0	0	0	0	20	1	2	2	120	6
Maryland ^{2,3}	0	0	0	0	37	12	12	12	152	49
District of Columbia ²	0	0	0	0	25	3	4	0	100	12
Virginia ^{2,4}	0	0	0	0	50	26	18	17	170	88
West Virginia.....	0	0	0	0	11	4	9	11	199	71
North Carolina ^{2,4}	0	0	0	0	31	21	25	36	508	340
South Carolina.....	0	0	0	0	31	11	22	33	281	101
Georgia ⁴	0	0	0	0	85	50	50	45	44	26
Florida ⁴	0	0	0	0	3	1	1	1	-----	-----
EAST SOUTH CENTRAL										
Kentucky.....	11	6	0	0	68	38	50	45	93	52
Tennessee.....	0	0	0	0	81	45	48	48	112	62
Alabama ⁴	0	0	0	0	36	20	15	24	61	34
Mississippi ²	0	0	0	0	28	11	16	16	-----	-----
WEST SOUTH CENTRAL										
Arkansas.....	0	0	0	0	71	28	57	23	46	18
Louisiana.....	0	0	0	0	51	21	17	21	166	68
Oklahoma.....	10	5	1	1	53	29	36	36	100	49
Texas ⁴	4	5	0	0	46	55	40	40	226	268
MOUNTAIN										
Montana ²	10	1	11	1	19	2	1	2	532	55
Idaho ²	63	6	9	2	32	3	0	0	21	2
Wyoming ²	0	0	0	3	0	0	0	0	111	5
Colorado ^{2,5}	19	4	3	2	34	7	2	2	243	50
New Mexico.....	0	0	0	0	37	3	5	5	222	18
Arizona.....	25	2	0	0	76	6	4	4	228	18
Utah ²	0	0	0	0	30	3	1	0	743	74

See footnotes at end of table.

Cases of certain diseases reported by telegraph by State health officers for the week ended July 16, 1938, rates per 100,000 population (annual basis), and comparison with corresponding week of 1937 and 5-year median—Continued

Division and State	Smallpox				Typhoid and paratyphoid fever				Whooping cough	
	July 16, 1938, rate	July 16, 1938, cases	July 17, 1937, cases	1933-1937 median	July 16, 1938, rate	July 16, 1938, cases	July 17, 1937, cases	1933-1937 median	July 16, 1938, rate	July 16, 1938, cases
PACIFIC										
Washington.....	57	18	0	4	16	5	2	3	195	62
Oregon ¹	41	8	3	3	15	3	4	4	178	35
California.....	12	14	7	3	14	17	15	9	211	249
Total.....	6	140	91	91	21	520	594	614	207	5,049
28 weeks.....	18	12,270	7,557	5,081	8	5,269	4,839	5,623	177	121,044

¹ New York City only.

² Rocky Mountain spotted fever, week ended July 16, 1938, 23 cases, as follows: Illinois, 5; Iowa, 1; Maryland, 2; District of Columbia, 1; Virginia, 4; North Carolina, 1; Montana, 1; Idaho, 3; Wyoming, 1; Colorado, 2; Oregon, 2.

³ Period ended earlier than Saturday.

⁴ Typhus fever, week ended July 16, 1938, 68 cases, as follows: Virginia, 1; North Carolina, 1; Georgia, 40; Florida, 4; Alabama, 10; Texas, 12.

⁵ Colorado tick fever, week ended July 16, 1938, Colorado, 1 case.

⁶ Information has been received that the report of 10 cases of poliomyelitis in New York State during the week ended July 9 (Public Health Reports of July 22, 1938, p. 1259) was an error. It is stated that only 1 case occurred during that week.

⁷ One nonparalytic case included.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Menigitis, meningococcus	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
May 1938										
Nevada.....	0	0	1		30		0	6	0	0
June 1938										
District of Columbia.....	6	28	2		118		0	43	0	1
Florida.....	4	18	3	19	157	39	5	11	0	23
Indiana.....	3	38	13		898		0	190	105	23
Maryland.....	4	17	6		308	6	1	174	0	14
Minnesota.....	2	17	9		1,275		0	248	61	4
Missouri.....	3	42	20	65	322	1	1	308	162	21
New Jersey.....	8	47	11	1	1,759		1	277	0	15
North Dakota.....	1	1	13		217		1	58	33	1
Pennsylvania.....	19	90			7,048		0	1,157	0	62
Vermont.....	0	1			299		0	21	0	0
Wyoming.....	0	3			49		0	16	5	2

Summary of monthly reports from States—Continued

May 1938		June 1938—Contd.		June 1938—Contd.	
	Cases		Cases		Cases
Nevada:		German measles—Con.		Septic sore throat—Con.	
Chickenpox.....	11	North Dakota.....	4	Missouri.....	36
Mumps.....	37	Pennsylvania.....	88	New Jersey.....	85
Rocky Mountain spotted fever.....	1	Hookworm disease:		Wyoming.....	1
Whooping cough.....	1	Florida.....	428	Tetanus:	
		Impetigo contagiosa:		Maryland.....	2
June 1938		Indiana.....	2	Minnesota.....	1
Actinomycosis:		Maryland.....	4	New Jersey.....	2
Pennsylvania.....	1	Leprosy:		Trachoma:	
Anthrax:		District of Columbia.....	1	Indiana.....	4
District of Columbia.....	11	Maryland.....	1	Minnesota.....	1
Chickenpox:		Mumps:		Missouri.....	33
District of Columbia.....	66	Florida.....	48	North Dakota.....	6
Florida.....	59	Indiana.....	52	Pennsylvania.....	1
Indiana.....	150	Maryland.....	108	Trichinosis:	
Maryland.....	311	Missouri.....	124	Maryland.....	2
Minnesota.....	543	New Jersey.....	956	Pennsylvania.....	1
Missouri.....	120	North Dakota.....	14	Tularaemia:	
New Jersey.....	1,366	Pennsylvania.....	2,638	Indiana.....	2
North Dakota.....	81	Vermont.....	75	Maryland.....	1
Pennsylvania.....	1,773	Wyoming.....	23	Minnesota.....	1
Vermont.....	160	Ophthalmia neonatorum:		New Jersey.....	1
Wyoming.....	24	Florida.....	2	Wyoming.....	1
Colorado tick fever:		Maryland.....	1	Typhus fever:	
Wyoming.....	4	New Jersey.....	8	Florida.....	11
Diarrhea:		Pennsylvania.....	2	Maryland.....	3
Maryland.....	27	Paratyphoid fever:		Undulant fever:	
Dysentery:		Florida.....	1	Florida.....	1
Florida.....	5	Maryland.....	2	Indiana.....	3
Indiana (bacillary).....	4	Minnesota.....	2	Maryland.....	7
Maryland.....	17	New Jersey.....	1	Minnesota.....	11
Minnesota (amoebic).....	1	Wyoming.....	2	Missouri.....	6
Minnesota (bacillary).....	10	Rabies in animals:		New Jersey.....	6
Missouri (amoebic).....	36	Florida.....	7	Pennsylvania.....	6
New Jersey (amoebic).....	2	Indiana.....	49	Vermont.....	2
Pennsylvania (bacillary).....	4	Maryland.....	1	Vincent's infection:	
Encephalitis, epidemic or lethargic:		Minnesota.....	40	Florida.....	40
District of Columbia.....	1	Missouri.....	22	Maryland.....	6
Missouri.....	1	New Jersey.....	47	North Dakota.....	5
New Jersey.....	4	Rabies in man:		Whooping cough:	
Pennsylvania.....	2	Florida.....	1	District of Columbia.....	36
German measles:		Rocky Mountain spotted fever:		Florida.....	71
Florida.....	1	District of Columbia.....	2	Indiana.....	72
Maryland.....	15	Maryland.....	5	Maryland.....	236
New Jersey.....	65	New Jersey.....	5	Minnesota.....	169
		Pennsylvania.....	1	Missouri.....	118
		Wyoming.....	11	New Jersey.....	863
		Septic sore throat:		North Dakota.....	67
		Florida.....	18	Pennsylvania.....	969
		Maryland.....	14	Vermont.....	97
		Minnesota.....		Wyoming.....	29

¹ Delayed report for May.

PLAGUE INFECTION FOUND IN FLEAS AND IN A GROUND SQUIRREL IN SAN BERNARDINO COUNTY, AND IN GROUND SQUIRRELS IN FRESNO COUNTY, CALIF.

Dr. W. M. Dickie, Director of Public Health of California, reported plague infection proved in California as follows:

June 28, 1938, in a pool of 14 fleas collected June 14, from 17 Golden Mantled squirrels, at the Fawnskin Resort, District No. 3, Big Bear, in San Bernardino County.

June 30, 1938, in a pool of 109 fleas obtained from 14 *Citellus beecheyi* squirrels, collected June 1, at the Osito Girl Scout Camp, Pine Knot, Big Bear area, San Bernardino County.

June 30, 1938, in a lot of 4 Tamarack squirrels collected May 27, from the vicinity of Swanson's Public Camp Grounds, near Shaver Lake, Fresno County. Also in a lot of 8 *Citellus beecheyi* squirrels collected from the same area at the same time.

July 7, 1938, in 1 *Citellus beecheyi* squirrel collected June 20, from the vicinity of Good Luck Camp, District No. 3, Big Bear area, San Bernardino County.

PLAGUE INFECTION FOUND IN GROUND SQUIRREL AND IN FLEAS FROM GROUND SQUIRRELS IN UTAH

Under date of July 15, 1938, Senior Surgeon C. R. Eskey reported plague infection found in a ground squirrel (*Citellus armatus*) and in fleas from ground squirrels (*Citellus armatus*) in Utah as follows:

Tissue from one ground squirrel secured June 28, 1938, at the south end of Strawberry Reservoir, Wasatch County.

A pool of 132 fleas collected from 52 ground squirrels shot July 2, 1938, on Dean Ranch, 1 mile west of Woodruff, Rich County.

WEEKLY REPORTS FROM CITIES

City reports for week ended July 9, 1938

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table.

State and city	Diph- theria cases	Influenza		Meas- les cases	Pneu- monia deaths	Scar- let fever cases	Small- pox cases	Tuber- culosis deaths	Ty- phoid fever cases	Whoop- ing cough cases	Deaths, all causes
		Cases	Deaths								
Data for 90 cities: 5-year average	127	40	16	1,962	346	654	8	382	64	1,291	-----
Current week ¹	111	20	11	1,388	284	393	5	320	38	1,364	-----
Maine:											
Portland	0	-----	0	7	2	0	0	0	0	1	13
New Hampshire:											
Concord	0	-----	0	0	1	0	0	0	0	0	11
Manchester	0	-----	0	0	0	0	0	0	0	0	14
Nashua	0	-----	0	0	0	0	0	0	0	0	4
Vermont:											
Barre	0	-----	0	0	0	0	0	1	0	0	4
Burlington	0	-----	0	0	0	1	0	0	0	0	13
Rutland	0	-----	0	0	0	0	0	0	0	0	5
Massachusetts:											
Boston	2	-----	1	87	9	24	0	11	0	11	174
Fall River	0	-----	1	1	1	4	0	1	0	6	22
Springfield	0	-----	0	50	0	1	0	1	0	5	37
Worcester	0	-----	0	3	3	1	0	0	0	13	45
Rhode Island:											
Pawtucket	1	-----	0	0	0	0	0	0	0	1	16
Providence	0	-----	0	0	1	5	0	1	0	25	51
Connecticut:											
Bridgeport	0	-----	0	1	1	4	0	0	0	0	24
Hartford	0	-----	0	2	1	3	0	0	0	4	36
New Haven	0	-----	0	1	0	0	0	1	1	3	34
New York:											
Buffalo	0	-----	0	2	7	10	0	9	2	11	136
New York	18	1	5	449	45	37	0	68	1	232	1,191
Rochester	0	-----	0	27	3	6	0	0	1	7	43
Syracuse	0	-----	0	29	4	2	0	0	0	17	45
New Jersey:											
Camden	0	-----	0	1	1	2	0	0	1	5	20
Newark	0	1	0	3	3	4	0	5	0	33	71
Trenton	0	-----	0	0	0	2	0	0	0	3	32
Pennsylvania:											
Philadelphia	2	-----	1	59	11	25	0	18	3	64	356
Pittsburgh	2	-----	0	4	7	10	0	3	1	31	125
Reading	0	-----	0	1	0	0	0	0	0	2	22
Scranton	0	-----	-----	1	-----	0	0	-----	0	0	-----
Ohio:											
Cincinnati	7	-----	0	4	4	4	0	4	0	35	115
Cleveland	4	2	0	68	6	17	0	7	1	54	172
Columbus	0	-----	0	3	0	1	0	1	0	1	77
Toledo	0	1	0	15	2	6	0	2	1	25	56
Indiana:											
Anderson	0	-----	0	0	1	1	1	0	0	0	12
Fort Wayne	0	-----	0	2	1	2	0	1	0	0	25
Indianapolis	1	-----	0	15	11	4	3	4	0	2	91
South Bend	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Terre Haute	0	-----	0	0	0	0	0	0	0	0	23

¹ Figures for South Bend, Ind., estimated; report not received.

City reports for week ended July 9, 1938—Continued

State and city	Diph- theria cases	Influenza		Mea- sles cases	Pneu- monia deaths	Scar- let fever cases	Small- pox cases	Tuber- culosis deaths	Ty- phoid fever cases	Whoop- ing cough cases	Deaths, all causes
		Cases	Deaths								
Illinois:											
Alton.....	0		0	0	0	0	0	0	0	1	2
Chicago.....	14	1	1	46	33	76	0	37	2	189	672
Elgin.....	0		0	0	0	0	0	0	0	0	15
Springfield.....	0		0	1	0	1	0	0	0	2	17
Michigan:											
Detroit.....	7		0	31	8	39	0	20	0	163	211
Flint.....	0		0	16	1	5	0	0	0	13	14
Grand Rapids.....	0		0	46	1	8	0	1	1	0	33
Wisconsin:											
Kenosha.....	0		0	10	0	1	0	1	0	5	8
Madison.....	0		0	40	0	0	0	0	0	4	14
Milwaukee.....	0		0	10	2	6	0	6	1	97	100
Racine.....	0		0	9	1	10	0	0	0	11	15
Superior.....	0		0	0	0	0	0	0	0	3	7
Minnesota:											
Duluth.....	0		0	33	0	1	0	1	0	16	22
Minneapolis.....	0		0	28	0	4	0	3	0	2	69
St. Paul.....	0		0	11	1	3	0	1	1	11	6
Iowa:											
Cedar Rapids.....	0			2		0	1		0	6	
Davenport.....	0			0		0	0		0	0	
Des Moines.....	0		0	2	0	2	2	0	0	0	35
Sioux City.....	1			23		0	0		0	4	
Waterloo.....	1			3		1	0		0	3	
Missouri:											
Kansas City.....	0		0	0	4	4	0	3	0	0	116
St. Joseph.....	0		0	0	2	0	0	0	0	0	31
St. Louis.....	7		0	1	4	6	0	7	2	8	358
North Dakota:											
Fargo.....	0		0	3	0	0	0	0	0	0	7
Grand Forks.....	0			3		0	0		0	0	
Minot.....	0		0	2	0	0	0	0	0	1	5
South Dakota:											
Aberdeen.....	0			2		0	0		0	3	
Nebraska:											
Lincoln.....	0			1		1	0		0	12	
Omaha.....	0		0	18	4	2	1	0	0	0	49
Kansas:											
Lawrence.....	0		0	1	0	0	0	0	0	2	5
Topeka.....	0		0	3	2	1	0	0	0	17	15
Wichita.....	1		0	0	2	1	0	0	1	2	24
Delaware:											
Wilmington.....	1		0	0	0	1	0	0	0	7	21
Maryland:											
Baltimore.....	1	1	1	13	8	8	0	7	0	26	170
Cumberland.....	0		0	4	0	2	0	0	0	0	14
Frederick.....	0		0	0	0	1	0	0	0	0	2
District of Colum- bia:											
Washington.....	2		0	12	11	5	0	12	2	4	155
Virginia:											
Lynchburg.....	3		0	1	1	0	0	0	1	3	10
Norfolk.....	0		0	0	0	0	0	0	0	3	15
Richmond.....	0		0	19	2	1	0	0	0	0	47
Roanoke.....	0		0	0	0	1	0	0	0	7	15
West Virginia:											
Charleston.....	0		0	0	0	0	0	1	0	0	7
Huntington.....	0			0		0	0		0	0	
Wheeling.....	0		0	1	0	1	0	0	0	1	20
North Carolina:											
Gastonia.....	0			0		0	0		0	5	
Raleigh.....	0		0	1	1	0	0	0	0	8	
Wilmington.....	0		0	0	0	1	0	0	0	11	8
Winston-Salem.....	0		0	51	0	0	0	1	0	11	15
South Carolina:											
Charleston.....	0	2	0	0	1	1	0	0	1	0	18
Florence.....	1		0	0	1	0	0	0	0	0	11
Greenville.....	0		0	2	3	1	0	0	0	3	4
Georgia:											
Atlanta.....	0	3	0	0	2	2	0	9	0	20	89
Brunswick.....	0		0	13	1	0	0	0	0	0	7
Savannah.....	0		0	0	3	0	0	2	0	6	27
Florida:											
Tampa.....	1		0	1	1	0	0	1	0	0	14

City reports for week ended July 9, 1938—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Small-pox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Kentucky:											
Ashland.....	0		0	0	0	0	0	3	1	0	18
Covington.....	0		0	1	1	0	0	2	0	5	20
Lexington.....	0		0	5	1	0	0	2	0	0	21
Louisville.....	1		0	22	2	6	0	2	0	12	73
Tennessee:											
Knoxville.....	0		0	4	3	1	0	0	0	4	34
Memphis.....	0		0	1	4	0	0	2	3	0	92
Nashville.....	0		0	3	7	0	0	3	0	10	66
Alabama:											
Birmingham.....	0	1	1	0	0	0	0	8	3	1	87
Mobile.....	0		0	0	1	0	0	2	0	0	24
Montgomery.....	1			3		1	0		0	1	
Arkansas:											
Fort Smith.....	0			2		3	0		0	0	
Little Rock.....	0		0	0	3	0	0	1	0	0	6
Louisiana:											
Lake Charles.....	0		0	0	0	0	0	0	0	0	13
New Orleans.....	8		0	4	11	4	0	16	4	45	133
Shreveport.....	0		0	0	7	0	0	2	0	0	52
Oklahoma:											
Muskogee.....	0			5		0	0		0	0	
Oklahoma City.....	0		0	0	2	2	0	1	0	0	36
Tulsa.....	1			17		0	1		1	11	
Texas:											
Dallas.....	2		0	1	1	1	0	1	0	7	70
Fort Worth.....	0		1	1	2	0	0	2	1	3	39
Galveston.....	0		0	0	0	1	0	1	0	0	15
Houston.....	2		0	2	4	3	0	4	2	0	72
San Antonio.....	0		0	0	2	0	0	6	0	1	43
Montana:											
Billings.....	0		0	0	0	0	0	0	0	4	5
Great Falls.....	0		0	0	2	0	0	0	0	7	6
Helena.....	0		0	0	0	1	0	0	0	0	3
Missoula.....	0		0	0	2	0	0	0	0	0	6
Idaho:											
Boise.....	0		0	0	1	0	0	0	1	1	5
Colorado:											
Colorado Springs.....	0		0	1	1	0	0	2	0	4	12
Denver.....	7		0	7	7	4	0	0	1	8	78
Pueblo.....	0		0	10	0	0	0	0	0	3	8
Utah:											
Salt Lake City.....	1		0	70	0	4	0	0	1	7	24
Washington:											
Seattle.....	0		0	4	3	1	0	5	0	15	80
Spokane.....	0		0	0	0	0	1	0	0	12	31
Tacoma.....	0		0	0	0	2	0	0	0	3	22
Oregon:											
Portland.....	0		0	2	1	6	0	2	0	7	57
Salem.....	0	1		0		0	0		0	0	
California:											
Los Angeles.....	16	7	0	53	8	14	0	15	0	21	260
Sacramento.....	0	1	0	8	1	0	0	1	0	9	28
San Francisco.....	2		0	6	1	1	0	4	0	22	131

State and city	Meningitis, meningococcus		Polio- mye- litis cases	State and city	Meningitis, meningococcus		Polio- mye- litis cases
	Cases	Deaths			Cases	Deaths	
New York:				Iowa:			
Buffalo.....	1	0	0	Des Moines.....	0	0	1
New York.....	1	1	0	Missouri:			
Pennsylvania:				St. Louis.....	0	0	1
Philadelphia.....	1	0	0	Georgia:			
Illinois:				Savannah.....	1	0	0
Chicago.....	0	0	1	Tennessee:			
Michigan:				Nashville.....	1	0	0
Detroit.....	0	0	2	Alabama:			
Minnesota:				Birmingham.....	1	1	2
St. Paul.....	1	0	0	Louisiana:			
				Shreveport.....	0	1	0

Encephalitis, epidemic or lethargic.—Cases: New York, 1; Philadelphia, 1; San Francisco, 1.
Pellagra.—Cases: Lynchburg, 1; Charleston, S. C., 1; Atlanta, 7; Birmingham, 4; New Orleans, 2; Spokane, 1; Los Angeles, 3; Sacramento, 1.
Rabies in man.—Deaths: Greenville, S. C., 1.
Typhus fever.—Cases: Savannah, 3; Houston, 1.

FOREIGN AND INSULAR

SWEDEN

Notifiable diseases—May 1938.—During the month of May 1938, cases of certain notifiable diseases were reported in Sweden as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis.....	7	Poliomyelitis.....	125
Diphtheria.....	2	Scarlet fever.....	3,430
Dysentery.....	8	Syphilis.....	25
Epidemic encephalitis.....	3	Typhoid fever.....	3
Gonorrhea.....	907	Undulant fever.....	19
Paratyphoid fever.....	3		

¹Includes 4 cases nonparalytic at time of notification.

YUGOSLAVIA

Communicable diseases—4 weeks ended June 19, 1938.—During the 4 weeks ended June 19, 1938, certain communicable diseases were reported in Yugoslavia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax.....	19	1	Measles.....	1	—
Cerebrospinal meningitis.....	55	22	Paratyphoid fever.....	16	1
Diphtheria and croup.....	366	20	Poliomyelitis.....	1	—
Dysentery.....	38	6	Scarlet fever.....	174	4
Erysipelas.....	169	3	Sepsis.....	9	4
Favus.....	9	—	Tetanus.....	53	19
Leprosy.....	1	—	Typhoid fever.....	168	18
Lethargic encephalitis.....	4	1	Typhus fever.....	72	4

(1321)

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Health, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following table must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place	Nov. 28- Dec. 25, 1937	Dec. 26, 1937- Jan. 29, 1938	Jan. 30- Feb. 26, 1938	Feb. 27- Mar. 26, 1938	Week ended—									
					April 1938					May 1938				
					2	9	16	23	30	7	14	21	28	June 1938 4 11 18 25
Alghanistan. ¹														
China:														
Hankow.....														
Hong Kong.....		2												
Macao.....		1												
Shanghai.....		3												
Swatow.....														
Dutch East Indies: Macassar.....														
India:														
Allahabad.....	5,326	9,330	6,718	12,561	1,534	1,353	5,093	6,796	5,149	3,962	3,009	10,064		
Assam.....	2,644	4,402	3,493	5,818	2	2,125	2,372	3,271	2,497	3,450	4,140	5,092		
Bassein.....	139	262	143	298	4	2	258	182	166	162	129	186		
Bombay Presidency.....	56	141	80	138	60	125	100	94	50	93	58	83		
Bombay:														
Calcutta.....	191	10		4	1	1	2							
Cawnpore.....	117	7	2	9	36	2								
Central Provinces and Berar.....	69	122	236	574	138	134	122	128	92	93	113	125		
Delhi.....	113	40	56	213	207	769	643	963	1,397	1,098	1,097	1,538		
Jodhpur.....				1	1	1	1	22	4	17	3	10		
Madras Presidency.....	2,654	3,914	957	705	54	70	305	597	549	348	232	136		
Madras:	1,178	1,801	499	376	24	27	125	285	269	150	96	72		
Northwest Frontier Province.....	160	120	16	3	1	1	1	4	3					
Orissa Province.....	40	29	6	2										
Gopalpur.....	39	77	82	102	29	54	56		30	88	197	87		

[illegible]

⁴ Cholera reported present early in June in South Afghanistan, Afghanistan.
⁵ Under date of June 7, 1938, the American Consul at Swatow reported approximately 200 cases of cholera with 50 deaths, in Swatow, China, for the period May 29-June 6, 1938.
⁶ Imported.
⁷ El Tor strain.

On vessels—Continued.		
Dec. 31, 1937	1 case	1 case
S. S. <i>Renee</i> at Calcutta from Port Said and Blyth	.....	S. S. <i>Arundel</i> at Calcutta
S. S. <i>S. S. Karai</i> at Calcutta from Port Said	.....	S. S. <i>Tak Sing</i> at Hong Kong from Shanghai and Swatow
S. S. <i>S. S. Karai</i> at Rangoon from Calcutta	.....
S. S. <i>Trinidad</i> at Calcutta from Japan	.....

PLAGUE I

[C indicates cases; D, deaths; P, present]

Place	Nov. 28- Dec. 25, 1937	Dec. 26, Jan. 29, 1938	Jan. 30- Feb. 26, 1938	Feb. 27- Mar. 26, 1938	Week ended—													
					April 1938						May 1938				June 1938			
					2	9	16	23	30	7	14	21	28	4	11	18	25	
Belgian Congo	2			4														
Bolivia:																		
Chuquisaca Department			35															
Sucre		2	1															
Santa Cruz Department			1	1														
Tarija Department				1														
Brazil. (See table below.)		54	3															
British East Africa:																		
Kenya			4	1														
Uganda	38	39	21	14	1	2	4	2	9	1	2	7	2	6	2	6	2	6
	30	24	24	14	1	2	4	2	6	2	6	2	6	2	6	2	6	2

¹ Including plague in the United States and its possessions.

2 Pneumonic.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Week ended—											
		April 1938				May 1938				June 1938			
		2	9	16	23	30	7	14	21	28	4	11	18
Ceylon:													
Colombo.....	C	1	1	2	1								
	D	1	1	2	5						1		
China: ²													
Plague-infected rats.....						1	2	1	1		1		
Dutch East Indies:						2	2	2	1		1		
Java and Madura.....	C					2	3			1			
Paseroean (vicinity of).....	C												
Ecuador:													
Chimborazo Province—Chimbo.....	C	247	287	306	238		45	37	42	48			
Colima.....	C	247	296	301	235		45	37	42	49			
Guayaquil.....	C	2	2	3			1						
Egypt:													
Asyut Province.....	C				10								
Beheira Province.....	C				5		7	1					
Gharbiya Province.....	C				4		4	1					
Hawaii Territory: ⁴ Plague-infected rats; ⁵	D	2	1	2	2		3	1	1				
Hawaii Island—Hauakua District.	D	2	2	3	2			1					
Egypt:													
Asyut Province.....	C		1				11			3	1		1
Beheira Province.....	C												
Gharbiya Province.....	C	1	1										
Hawaii Territory: ⁴ Plague-infected rats; ⁵	C												
Hawaii Island—Hauakua District.	C												
Hauakua Mill Sector.....		8	1	2			2						
Kakaula.....							1						
Paschad Sector.....		2	8	3	3		1	1	2				
Paschad Sector.....		14											
Paschad Sector.....							1						
Manu Island:													
Makawao District—Plague-infected rats		6											
Omaupo. ⁴													
India:													
Waluku District—Punene.....	D	446	1,968	3,482	3,883	774	547	509	380	84	100	67	22
	C	658	965	1,532	2,026	383	188	253	280	30	78	111	24
Allahabad.....	C												
Bassein.....	C												
Bombay Presidency.....	C	51	24	2	1	1	15	13	11	2	1	3	1
	D	37	13	2	28	9	6	8	6	1	1	5	2

Central Provinces and Berar.....	C	300	486	833	1,306	259	259	176	93	43	19	21	3	2	1	---
Madras Presidency.....	C	160	330	157	69	35	11	11	8	5	12	7	7	---	---	---
Mandalay.....	D	84	174	69	36	12	2	4	4	4	8	5	1	---	---	---
Punjab.....	C	---	41	---	121	---	---	---	---	---	---	---	---	---	---	---
Rangoon.....	C	---	---	---	115	---	---	---	---	---	---	---	---	---	---	---
Plague-infected rats.....	C	---	---	3	1	---	1	---	---	---	---	---	---	---	1	---
Bagdad.....	C	---	---	3	2	---	1	---	---	---	---	---	---	---	1	---
Madagascar. (See table below.).....	D	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---
Niger Territory. (See table below.).....	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Senegal: N' Bour subdivision.....	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Tunisia: Tunis: Plague-infected rats.....	C	1	---	1	1	---	---	---	---	---	---	---	---	---	1	---
Union of South Africa.....	C	---	---	13	7	---	---	---	---	---	---	---	---	---	---	---
Cape Province—Port Elizabeth.....	D	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
United States: *	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
California: *	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Fresno County—Plague-infected fleas.....	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Santa Cruz County—	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Plague-infected fleas.....	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Plague-infected ground squirrels.....	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---
Idaho: *	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Bannock County—	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Plague-infected fleas and lice.....	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Plague-infected squirrels.....	---	---	---	---	---	---	---	---	---	---	---	---	---	1	3	---
Bear Lake County—	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Plague-infected fleas.....	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Plague-infected squirrel.....	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---
Montana: *	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Beaverhead County—	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Plague-infected fleas.....	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Plague-infected squirrels.....	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Gallatin County—Plague-infected fleas.....	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Nevada: * Clark County—Plague-infected fleas.....	---	---	---	---	---	---	---	---	---	---	---	---	---	---	8	2
Oregon: *	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Baker County—	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Plague-infected fleas.....	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Plague-infected ground squirrels.....	---	---	---	---	---	---	---	---	2	---	---	---	---	---	---	---
Grant County—	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Plague-infected fleas, lice, and tick.....	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Plague-infected ground squirrel.....	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---

* Pneumonic.

* Information dated May 9, 1938, states that an outbreak of bubonic plague has occurred in Kochow District, and on Hainan Island, China.

* During the week ended Nov. 20, 1937, plague infection was proved in 10 rats by mass inoculation in Onaspio, Makawao District, Maui Island, Hawaii Territory.

* For 2 weeks.

* Plague infection proved in insect hosts as follows: *California*—Fresno County, June 15, 1938; Santa Cruz County, Feb. 3-Apr. 27, 1938; *Idaho*—Bannock County, May 21-June 3, 1938; Bear Lake County, May 25-27, 1938; *Montana*—Beaverhead County, June 1-24, 1938; Gallatin County, May 24-25, 1938; *Nevada*—Clark County, Apr. 14-22, 1938; *Oregon*—Baker County, Apr. 22-May 2, 1938; Grant County, May 12-21, 1938; *Utah*—Kane County, May 20, 1938; *Washington*—Adams County, Mar. 7-30, 1938; *Wyoming*—Uinta County, June 27, 1938.

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place	Nov. 28- Dec. 25, 1937	Dec. 26, 1937- Jan. 29, 1938	Jan. 30- Feb. 26, 1938	Feb. 27- Mar. 26, 1938	Week ended—									
					April 1938					May 1938				
					2	9	16	23	30	7	14	21	28	June 1938 4 11 18 25
Algeria:														
Algiers Department.....									1	1				1
Constantine Department.....			1					1						1
Southern Territories.....														
Angola. (See table below.)														
Belgian Congo. (See table below.)														
Bolivia. (See table below.)														
Brazil (see also table below):														
Bahia (alastim).....														
Porto Alegre.....														
British East Africa: Tanganyika.....	9													
Canada:														
Alberta.....		1	190				26	162		1				
British Columbia.....		2	3	18		17		12				1		112
Manitoba.....		11	1											18
Nova Scotia—Halifax.....				3										
Saskatchewan.....		11	13											
China:														
Canton.....	2	33	79	98	10	7	11	6	12	1				
Dairen.....			1	1		2						1		1
Foochow.....	P													
Hankow.....			3		1	6		9		2	8		1	
Hong Kong.....	13	255	641	766	162	128	56	115	53	34	26	21	9	3
Macao.....		107	502	639	112	107	56	75	40	38	25	20	10	8
Shanghai.....			2		1	1	1	2	3			1		1
Szechow.....	1	7	10	9	2	6	3		1	2	5	1		2
Tientsin.....						31					1			
Chosen. (See table below.)	1													
Columbia:														
Barranquilla.....									1					
Cartagena.....	D													
Dahomey.....	D													
Dutch East Indies: Batavia.....												119	1	
Ecuador: Guayaquil.....			1							3				

1 For 2 weeks.

* Imported.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued.

[C indicates cases; D, deaths; P, present]

Place	Nov. 28- Dec. 25, 1937	Dec. 26, Jan. 26, 1938	Jan. 30- Feb. 26, 1938	Feb. 27- Mar. 26, 1938	Week ended—													
					April 1938						May 1938				June 1938			
					2	9	16	23	30	7	14	21	28	4	11	18	25	
Egypt:																		
Alexandria	C																	
Port Said	C		3	6	4	2			3									
Eritrea	C	8	7	14		1							1					
Great Britain: England and Wales—																		
Kent County—Gravesend	C			3														
Leighton Buzzard	C			2														
Port of London	C			1														
Greece. (See table below.)																		
Guatemala. (See table below.)																		
Honduras: Tela	C																	
India																		
Allahabad	C	3,930	9,248	12,752	2,927	3,639	3,193	3,582	3,351	3,399	2,719	2,649	1					
Assam	C	958	2,645	2,991	524	792	744	774	741	782	736	778						
Basatin	C	56	95	147	20	66	48	24	57	31	65	43	64	48	39	48	28	
Bombay Presidency	C	570	1,130	2,362	743	688	737	623	778	595	391	443	291	272				
Bombay	C	165	316	674	138	136	130	104	112	111	87	84	55	55				
Calcutta	C	269	690	950	874	142	130	91	95	50	61	38	27	33	22	13	9	13
Cawnpore	C	119	350	545	491	83	65	51	36	43	23	22	20	13	11	9	5	5
Central Provinces and Berar	C	69	235	431	848	147	228	123	127	143	113	80	76	67	52	42	45	26
Chittagong	C	43	177	273	565	107	164	115	91	97	86	68	66	53	44	33	40	25
Delhi	C	15	51	230	240	124	117	110	92	64	98	93	22	127	102	58	45	55
Howrah	C	6	9	13	4	7	6	5	5	9	3	1	1	1	1	1	1	1
Jodhpur	C																	
Karachi	C																	
Madras Presidency	C	4	18	12	2	3	7	4	9	10	11	6	1	5	1	3	1	3
Madras	C	245	899	684	169	141	157	146	86	111	78	72	129					
Meerut	C	51	172	129	88	28	31	39	22	21	13	21	20					
Mysore	C	88	359	248	249	58	57	46	42	38	43	38	27	30	47	16	24	39
Nagapattam	C																	
Northwest Frontier Province	C	417	748	100	155	8	14	10	54	43	23	36	133	9	45	10	18	18
Orissa Province	C	353	831	940	1,291	278	357	140	108	152	175	156	134	239	142	146	74	125
Punjab	C	1,035	1,641	952	1,830	104	63	146	106	134	109	33	42	29	14	7	15	8

* A report dated Feb. 10, 1938, states that 16 cases of smallpox were reported in Puerto Cabello: information dated Feb. 21, 1938, states that 4,000 cases of smallpox (alsetrim) were reported in Barquisimeto, Lara State, Venezuela, and that smallpox is present from Barquisimeto to Valencia and Maracay.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

On vessels:		On vessels—Continued	
S. S. <i>Andal</i> at Singapore from Hong Kong.....	1 case.....	S. S. <i>Natuta Maru</i> at Molli from Dalren.....	1 case.....
S. S. <i>Rizwan</i> at Kamran.....	1 case.....	S. S. <i>Noriken</i> at Singapore from Hong Kong and Swatow.....	1 case.....
S. S. <i>Tai Sen Hong</i> at Sandakan from Hong Kong.....	1 case.....	S. S. <i>Kum Sang</i> at Singapore from Kobe, Amoy, and Hong Kong.....	1 case.....
S. S. <i>Suiyang</i> at Penang from Hong Kong and Singapore.....	1 case.....	S. S. <i>Haruna Maru</i> at Kobe from Hong Kong.....	1 case.....
S. S. <i>Hong Siang</i> at Singapore from Amoy, Swatow, and Hong Kong.....	1 case.....	S. S. <i>Hinsang</i> at Sandakan from Hong Kong.....	2 cases.....
S. S. <i>Tsue</i> at Singapore from Hong Kong.....	1 case.....	S. S. <i>Kiterin Maru</i> at Molli from Dalren.....	1 case.....
S. S. <i>Meinam</i> at Singapore from Hong Kong.....	1 case.....	S. S. <i>Sirhana</i> at Singapore from Kobe, Amoy, and Hong Kong.....	1 case.....
S. S. <i>Tanaka Maru</i> at Honolulu.....	1 case.....	S. S. <i>Proper</i> at Singapore from Hong Kong and Swatow.....	2 cases.....
S. S. <i>Circassia</i> at Aden from Bombay.....	1 case.....	S. S. <i>Stratford</i> at Fremantle.....	2 cases.....
S. S. <i>Chandala</i> at Akyab from Chittagong.....	1 case.....	S. S. <i>Shirata</i> at Singapore from Japan.....	1 case.....
S. S. <i>Empress of Japan</i> at Honolulu.....	1 case.....	S. S. <i>Hosang</i> at Singapore from Hong Kong.....	3 cases.....
S. S. <i>Tilava</i> at Singapore from Hong Kong.....	1 case.....	S. S. <i>Cremer</i> at Singapore from Amoy, Swatow, and Hong Kong.....	1 case.....
S. S. <i>Seringa</i> at Calcutta from Port Said.....	1 case.....	S. S. <i>Jean Laborde</i> at Singapore from Kobe, Shanghai, Hong Kong, and Saigon.....	1 case.....
S. S. <i>Yuen Sang</i> at Singapore from Hong Kong.....	1 case.....	S. S. <i>Sandoiken</i> at Singapore from Hong Kong.....	1 case.....
S. S. <i>Cathay</i> at London.....	1 case.....	S. S. <i>Hinsang</i> at Sandakan from Hong Kong.....	1 case.....
S. S. <i>City of Auckland</i> at Halifax from Calcutta.....	3 cases.....	S. S. <i>Forth Bank</i> at Niigata from Vancouver.....	1 case.....
S. S. <i>Kaiser-i-Hind</i> at Yokohama from Hong Kong.....	1 case.....		
S. S. <i>Van Heutsz</i> at Singapore from Amoy, Swatow, and Hong Kong.....	1 case.....		
S. S. <i>Hai Hing</i> at Singapore from Amoy, Swatow, and Hobow.....	1 case.....		

[C indicates cases; D, deaths; F, present]

Place	Decem- ber 1937	Janu- ary 1938	Febru- ary 1938	March 1938	April 1938	May 1938	Place	Decem- ber 1937	Janu- ary 1938	Febru- ary 1938	March 1938	April 1938	May 1938
Angola.....	7	19	29		85		Mexico—Continued.						
Belgian Congo.....	222	251	336				Chihuahua State.....				1		
Bolivia.....							Hidalgo State.....			1	1		
Cochabamba Department.....			4		1	5	Mexico State.....		8	4	6		
La Paz Department.....			11	9	12	6	Mexico, D. F.....				1		
Oruro Department.....					1	1	Puebla State.....			4	6		
Potosi Department.....			5	2	4	1	Queretaro State.....				1		
Santa Cruz Department.....			5	1	1	1	San Luis Potosi State.....				1		
Tarifa Department.....					1	1	Tamaulipas State.....				4		
Brazil (see also table above).....		4	4				Morocco.....						
Chosen.....					5		Portugal (see also table above).....	18	62	13		4	
Greece: Salonika.....	7	10	1	7	1	2	Salvador.....	3	2	2			
Guatemala.....						3	Senegal.....		16	42	103		
Indochina (French) (see also table above).....	319	694	864	1,268	1,237		Union of South Africa.....						
Ivory Coast.....	91	188	189	237	161		Cape Province.....	42					
Mexico (see also table above):.....			48	23			Transvaal.....	41					
Chiapas State.....			1	1			Venezuela.....						8

* For January and February.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place	Nov. 28- Dec. 25, 1937	Dec. 26, 1937- Jan. 25, 1938	Week ended—												June 1938			
			March 1938			April 1938						May 1938			June 1938			
			5	12	19	26	2	9	16	23	30	7	14	21	28	4	11	18
Algeria:																		
Algiers Department.....	C	13	29	15	36	13	13	16	13	4	6	4	14	7	9	4	27	16
Algeria.....	C	24	0	1	2								5	1	1		1	
Constantine Department.....	C	117	98	12	59	25	45	65	33	25	24	16	64	35	43	47	59	23
Bone.....	C	1	2										1					1
Constantine.....	C	1	1	4									34	23	37			5
Philippeville.....	C	2	2										1					
Oran Department.....	C	22	5	13	2		1	1	3	6		24	10	3	1	10	2	
Southern Territory.....	C	1	1	17			4	2				4	1					
Australia: Brisbane.....	C	1	1															
Basutoland.....	C																	
Bolivia. (See table below.).....	C																	
British East Africa: Kenya.....	C																	
Bulgaria.....	C	5	24											10				
Chile.....	C	196	85	11	21	16	5	8	11	1	1	4						
Concepcion Province.....	C	1			8	1	1	1	5									
Lima.....	C	1																
Linars Province.....	C	3	2															
Malacca Province.....	C	3																
Nubia Province.....	C	19	13	5	3			1										
Shanghai.....	C	157	59	33	12	11	6	4	3				1	1		2	1	3
Santiago Province.....	C	1	6	2														
Valparaiso.....	C																	
China (see also table below):																		
Dairen.....	C	1										2			1	1	2	
Hankow.....	C	1	1							1			2					
Harbin.....	C	1	1															
Hong Kong.....	C																	
Shanghai.....	C	1			2	8	16	68	27	28	58	65	91	64	96	103		
Tientsin.....	C	4	1				1	1										
Chosen (see table below.).....																		
Czechoslovakia. (See table below.).....																		
Dutch East Indies: Sumatra. (See table below.).....																		
Egypt:																		
Alexandria.....	C	3	1	2	1	4	3	2	1	4	2		2	1	8	3	2	1
Aswan Province.....	C			3		16		2				14	13		11		2	2

Asyut Province.....	1	9	10	12	21	3	7	12	1	1	59	50	1	11	41	30	15
Beheira Province.....	1	3	2	7	3	3	7	4	6	7	1	6	2	4	11	3	5
Cairo.....	1	1	49	17	10	7	5	5	2	2	3	3	2	7	2	8	20
Dakahlia Province.....	3	14	4	4	1	14	8	14	3	4	21	14	14	12	3	2	24
Gharbiya Province.....	3	13	2	2	2	2	2	14	2	2	41	33	4	16	9	9	24
Minia Province.....	5	5	8	8	3	3	2	2	2	2	2	4	1	1	1	1	1
Port Said.....	1	1	5	5	20	38	45	45	102	120	148	176	105	214	147	146	50
Qena Province.....	7	61	177	35	61	84	80	80	102	120	148	176	105	214	147	146	50
Sharkia Province.....	7	61	177	35	61	84	80	80	102	120	148	176	105	214	147	146	50
Provinces.....	7	61	177	35	61	84	80	80	102	120	148	176	105	214	147	146	50
Greece. (See table below.)																	
Guatemala. (See table below.)																	
Hawai Territory: Honolulu.....	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Hungary.....	4	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Iran.....	4	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Teheran.....	4	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Iraq: Baghdad Province.....																	
Latvia. (See table below.)																	
Lithuania. (See table below.)																	
Mexico (see also table below):																	
Mexico, D. F.....	20	13	12	3	5	8	2	11	14	10	4	1	2	2	2	2	2
Saktillo.....			1														
San Luis Potosi.....			1														
Tecamachalco.....			1														
Torreón.....			1														
Morocco (see also table below)	315	743	783	299	411	372	234	206	199	243	198	165	162	175	171	169	165
Casablanca.....	24	79	173	29	70	78	36	24	35	35	19	13	10	77	18	9	15
Netherlands: Rotterdam.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Palestine:																	
Haifa.....	8	4															
Jaffa.....	3	5	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Panama Canal Zone. (See table below.)																	
Poland.....	141	396	431	145	161	207	176	130	145	125	108	144	100	135	100	88	97
Portugal. (See table below.)	3	30	23	7	11	11	9	3	4	7	8	8	3	7	4	1	3
Rumania. (See table below.)																	
Sierra Leone. (See table below.)																	
Straits Settlements: Freetown.....																	
Straits Settlements: Singapore.....	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Syria: Deir-az-Zor.....																	
Trans-Jordan.....																	
Tunisia:																	
Tunis.....	2	2	4	3	1	1	3	1	1	3	2	5	5	2	6	3	6
Turkey. (See table below.)	57	284	211	100	41	75	45	57	63	25	25	72	45	38	94	78	103
Union of South Africa. (See table below.)																	
Yugoslavia: Belgrade.....																	
On vessels:																	
S. S. Blackhill at Philippeville.....																	
S. S. Empress of Japan at Yokohama.....																	

1 Imported.

* Suspected.

